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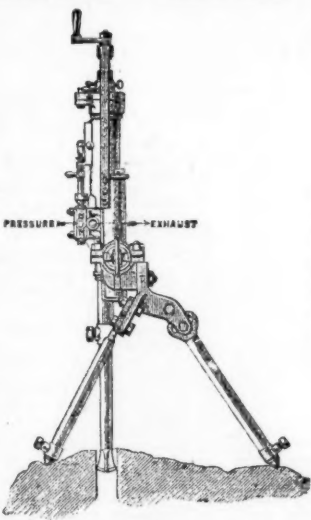
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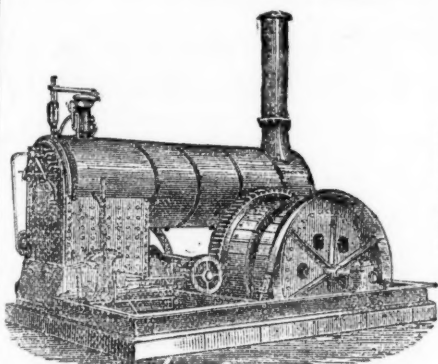
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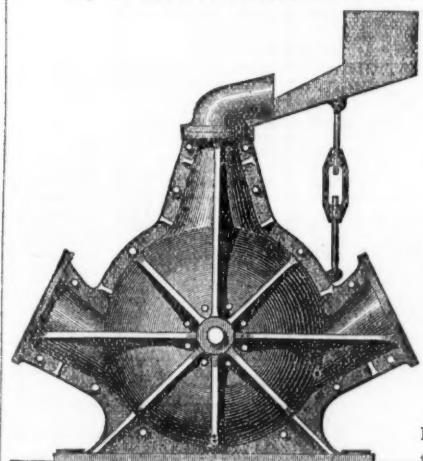
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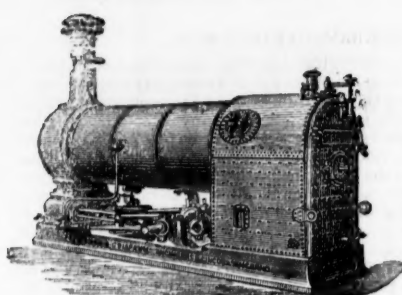
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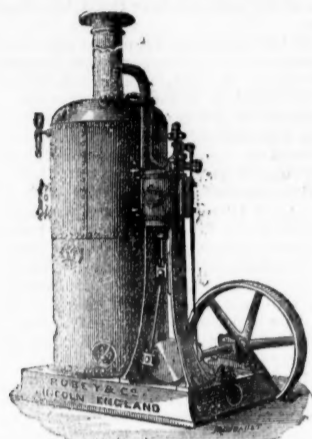
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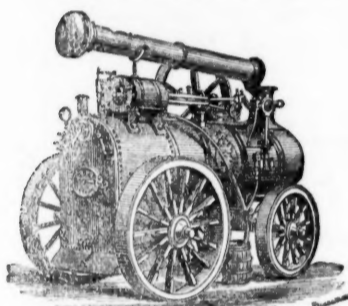
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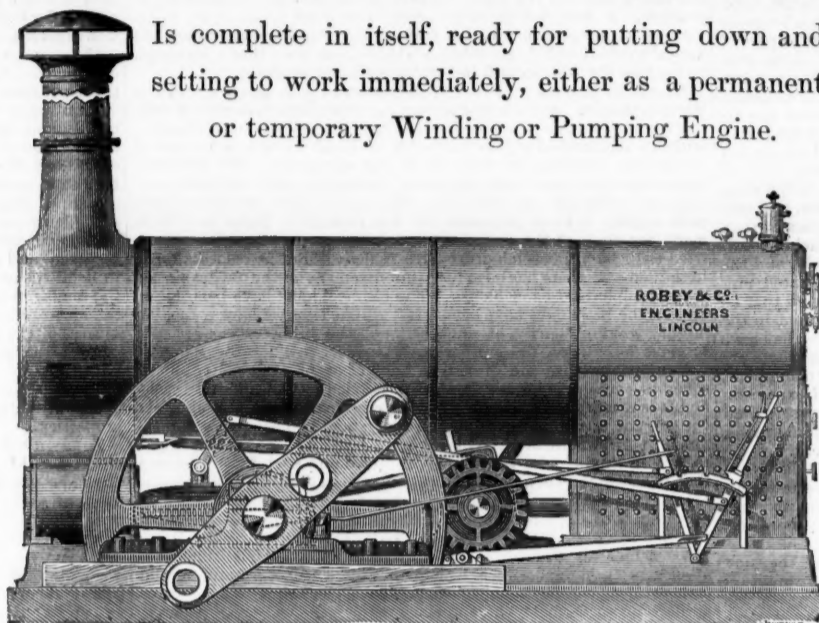
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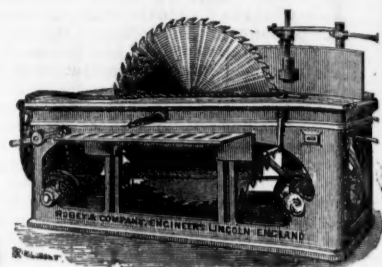


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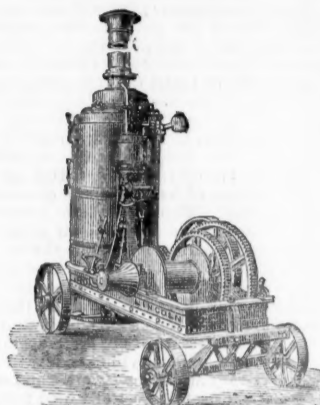
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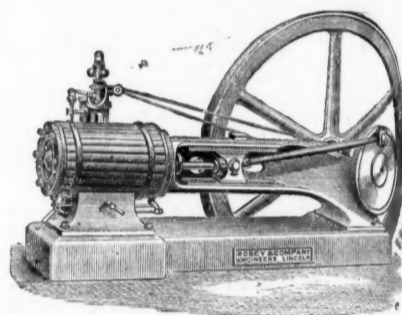
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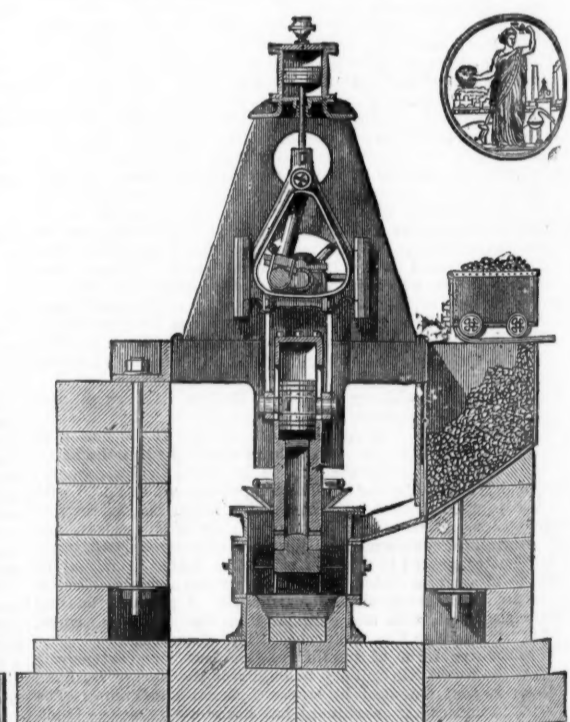
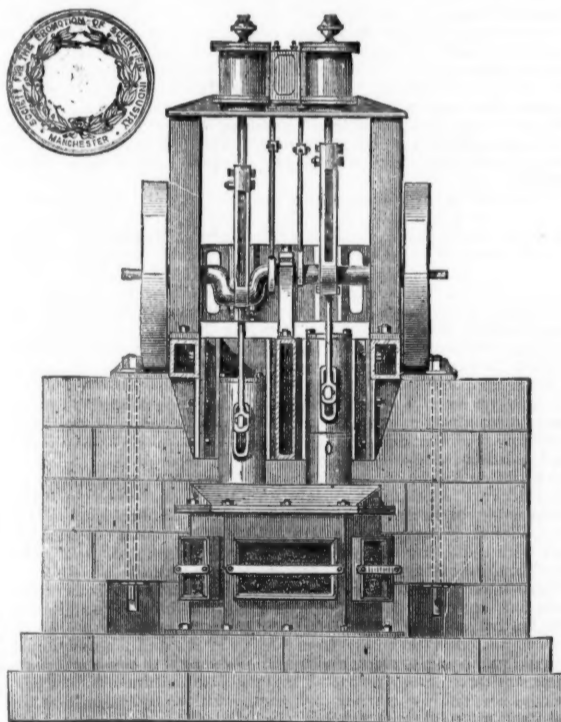
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## Original Correspondence.

## COMPRESSED AIR MACHINES.

SIR,—The properties of air were treated of in last paper. The increase of pressure caused by simple compression is inversely as the decrease in volume—that is to say, if compressed to half its volume the pressure would be double the atmospheric pressure, and so on for any higher pressure; but, in addition to this, when air is subjected to rapid compression the element of heat comes into play. As the compression is intensified so is the temperature of the air raised. The air in this heated state issuing from the compressor, having much greater force than is due to mere compression or decrease in volume, offers a corresponding resistance to the steam-engine connected with the compressor—in other words, part of the power of the steam-engine is absorbed by the force created by the air becoming heated in the act of compression. If this heat in the air could afterwards be maintained it would serve a very useful purpose. As has already been shown, if the air in this heated state could be utilised in the working cylinder of the hauling or other engine to which the power is to be applied, then the difficulty of the formation of ice and contraction of the exhaust ports would not occur; besides, the compressed air could then more readily be used expansively in the working cylinders. In practice, however, the compressed air cools rapidly after being discharged from the compressor, and, therefore, a part of the power of the steam-engine will have been dissipated. If we suppose one stroke of the piston in the compressor to have been made, and the temperature and pressure of the compressed air to be noted, if the same air is allowed to cool down to the temperature of the atmosphere it will be found that the compressed air behind the piston has come down considerably in pressure, due not to leakage, but to the loss of the heat engendered during its compression. It has, therefore, been the object with engineers to keep the air in the compressor cold. The various systems of preventing heat during compression have been referred to; if this can be done effectually then one of the sources of loss in the use of compressed air machines will have disappeared. When the steam is worked expansively, and the compressed air-engines also, the air in the latter being heated previous to its introduction into the cylinder, it is considered that 60 per cent. of the power of the steam-engine may be given out in the working cylinders. The experiments and the statements that have been made on this point are so various that careful experiments are greatly required as to the useful effect of air compressing machinery, with details as to pressure of air, its temperature, degree of expansion both in the steam and air cylinders, length and size of pipes, &c., all of which may vary at different works, and will influence to a greater or less extent the useful effect obtained from the machinery.

To obtain the best result in working the compressor the steam should be used at high pressure, say 70 lbs., and cut off at one-fourth or one-third of the stroke; by this means it has been asserted that 80 per cent. of the steam power would be realised in the compressor. But if the steam were used at only half this pressure—or 35 lbs.—and not expanded, in the latter case it will be found about the same work would be done by the engine, while a much larger consumption of fuel or steam takes place. A similar result would follow the use of heated air expanded in the working cylinders, whether these were in operation continuously, as in the endless rope system, or intermittently, as in the main and tail rope system. If 80 per cent. of the energy of the compressed air as it is discharged from the compressor were utilised in the working cylinders there would then be a result of 64 per cent. as the ultimate useful effect of the prime motive power, though it is probable that a larger allowance than 80 per cent. will in most cases be required for the working engines on account of the friction and leakage in the pipes.

The writer does not think it is requisite to go into the question of the comparative economy of steam and compressed air, but has endeavoured to show how the best results may be obtained when the latter is adopted: and if an useful effect of 64 per cent. can be attained with the use of the most approved form of compressed air machinery, such a result would compare favourably with the more common system of steam-engine and rope haulage in almost any mine, even when the former is placed at the bottom of the shaft, and whether the ropes are of moderate length or they extend to a great distance into the mine. But where an engine is to be fixed underground at some distance from the shaft the advantages of compressed air machines are so great that it would be unwise to place steam engines in such situations.

Compressed air as a motive power appears to be more extensively adopted in the South Wales coal mines than in other mining districts. This may be owing in part to the extensive opening out of the deeper portion of that coal field in late years. During the first operations in developing a mine is the proper time to lay down plant and machinery by which the drainage and hauling are to be effected during a lengthened period of years, or until the exhaustion of the mine. The machinery for compressing air at New Tredegar is an instance. It consists of a pair of horizontal steam cylinders 21 in. diameter, 5 ft. stroke, at 30 strokes per minute, and 26 1/2 lbs. pressure, the indicated horsepower has been ascertained to be 168. A pair of compressors are each 21 in. diameter, 5 ft. stroke, and the indicated power 129, equal to 76.8 per cent. of the steam power when the air was compressed to 20.5 lbs. per square inch. There are four underground engines which derive their motive power from the compressing machinery on the surface; two hauling engines, each have a pair of 12-in. cylinders, 18 in. stroke. One makes 120 revolutions, the other 162 per minute, and two pumping engines, each has 7 in. air cylinder, 4 1/2 in. ram, 7 in. stroke, single-acting, making 45 strokes per minute.

The compressing machinery at Powell's Duffryn Colliery in South Wales, consists of two steam cylinders coupled together at right angles, 34 in. diameter, 6 ft. stroke, steam pressure 70 lbs. cut off at one-fourth of the stroke; the two compressors are 40 in. diameter, 6 ft. stroke, the air is compressed to 40 lbs. above the atmosphere; piston-speed 240 ft. per minute. The compressors are enclosed with water-jackets, open at the top. The underground hauling engines actuated by compressed air (26 in. number) are of three sizes—one has two horizontal cylinders 12 in. diameter, 12 in. stroke, two drums 4 ft. in diameter, geared in the ratio of 1 to 5. Either drum may be engaged by means of a clutch. For branch roads a single cylinder-engine is used, with drums similarly arranged. A portable hauling engine is also used, with one cylinder 8 in. diameter 9 in. stroke, geared in ratios of 1 to 6 to two drums of 2 ft. diameter.

The locomotive form of hauling engine has been extensively adopted at the Newbottle Colliery, belonging to the Earl of Durham. The engine is that patented by Messrs. Lishman and Young. The most recent compressing machinery has been erected at the D pit, consisting of two horizontal steam cylinders of 30 in. diameter, 7 ft. stroke, and compound compressors, one of 36 in. and one of 20 in. diameter, with 7 ft. stroke. The final pressure obtained from the latter cylinder is 200 lbs. per square inch. One locomotive is used at present underground. It has one 4 1/2 in. cylinder, working over a road nearly level 700 yards in length; 25 tubs per train are taken at a slow speed.

At the Dorothea pit, Newbottle Colliery, seven smaller locomotives have been in operation for some years, one of the least has one 3-inch cylinder 6-inch stroke air receiver 20 cubic feet capacity, it hauls three laden tubs up a gradient in 1 in 25: 90 laden trains can be conveyed in 10 hours. The road is 220 yards in length, and 103 tons of coal are conveyed in that time. In another part of the mine six locomotives convey trains over a road 880 yards in length; the ruling gradient is 1 in 48, the steepest is 1 in 36. Both 3 in. and 3 1/2 in. cylinder locomotives are used on this road. One 3 1/2 in. cylinder conveys a train of six tubs, in and out, in ten minutes; this includes charging with air twice, each charge being made in half a minute. Each locomotive hauls 45 trains out in 10 hours, or 108 tons of coal. A locomotive with one 3 1/2 in. cylinder, 7 in. stroke, and a receiver of 25 cubic feet capacity, weighs about 18 cwt. The compressing machinery at the top of this pit is of a temporary character; there are two horizontal steam cylinders, 22 in. diameter, 3 ft. stroke, and two compressors, the first of which is 24 in. diameter; it compresses to 45 lbs.; the compressed air is then passed to the second

compressor, 17 in. diameter, 3 ft. stroke. In this the air is compressed to 200 lbs. per square inch. The air is taken from the receivers in pipes down the pit and used in the cylinders of the locomotives at this pressure. The air in the compressors is cooled by immersing the cylinders in cold water, but this has a very slight effect on its temperature. M. E.

## THE RISCA EXPLOSION.

SIR,—Some of us who do not intend to shut up our pockets upon this new appeal to public charity may yet be permitted to ask how long the present most unsatisfactory mode of dealing with cases of the kind is to endure. Ere yet the smoke had cleared away from the Risca pit mouth there was a rush to the Lord Mayor of London as the permanent focus of relief, and other less conspicuous chief magistrates will no doubt by-and-by be appealed to, with what result remains to be seen. At present, as I have long ago pointed out, the public offers a premium upon big explosions, and in this way, that if only 10 men be killed the public passes by on the other side, but if 100 lose their lives in one of these so-called visitations of God each unit of the 100 receives far more than any unit of the 10. The British public responds to holocausts, while slaughter in detail moves it not at all. It would be an interesting and perhaps not altogether fruitless calculation to try to ascertain at what point of life sacrifices the intervention of the Lord Mayor could confidently be solicited or granted. A merciful colliery owner is at least as merciful to his colliers as a shipowner to his sailors, but the shipowner does not appeal to the Lord Mayor when a whole crew goes down, although in his case the widows and the orphans are not wanting.

Nearly 20 years ago (Dec. 7, 1860) I wrote you about a previous Risca explosion; and a better known correspondent than myself, who has recently left us—I mean Mr. Thomas Wrigley, of Timberhurst—with his accustomed vigour and grip of facts wrote you *apropos* of the Hetton explosion on Dec. 27 of the same year. Mr. Wrigley's letter, as might have been expected, contained some valuable suggestions, although he wrote, in respect of colliery accidents, "we seem neither to know the cause nor the remedy." There have been many accidents of the sort since, and many good and true men have tried their hands at some preventive remedy. But as respects relief to the sufferers there has been little improvement on the old-fashioned plan of haphazard benevolence. The big accidents have been taken up and the little ones have been left. At one time we have a rushing mighty wind of charity, at another "not the limberest leaf is seen to move."

You may accuse me of riding hobbies or of starting eccentric schemes—eccentric because not hitherto tried—but I am quite satisfied it is a reflection upon the vaunted practicality of this age that the present precarious system of relief should continue six months longer. An American was remarking the other day that the strongest reason an Englishman could give for not doing a certain thing was that it had never been done before, whereas in the United States the reverse was the case. Probably this doctrine of the Englishman may prevail in the case of permanent relief to miners. You may remember we tried to do something in a remedial direction nearly two years ago. A meeting was held at the Town Hall. We had many elements of success—a high sheriff, a bishop, an archdeacon, and mining officials, whilst secretaries much abounded. The sequel we know, or perhaps do not know. There appears to have been a happy dispatch, not in the English, but in the Japanese sense. Meanwhile the Mayor of Newport is as one crying in the wilderness and knowing not whence the moneyed response may issue. He addresses the wide world, laying much stress upon the larger centres of business, where we know as well beforehand who will give and who will not as we know the sequence of the calendar months. I am trying my hands at a scheme of insurance, not for accidents but deaths by accident. I agree with the late Mr. Edward Denison, the member for Newark, who said, "charity, too, is a frightful evil—not real charity, but subscription charity . . . The gigantic subscription lists which are vaunted as signs of our benevolence are monuments of our indifference."

It seems rather hard to characterise the splendid subscriptions for colliery accidents of late years as "monuments of our indifference;" nevertheless, Mr. Denison's words will repay a little reflection—so at least it seems to yours.—July 20. ELLIS LEVER.

## THE RISCA COLLIERY EXPLOSION.

SIR,—This dreadful occurrence will certainly attract general attention, and a rigid investigation into its causes will, no doubt, be made. It is sad to think that such a beautiful valley should be the scene of those dire calamities which have occurred from time to time at intervals during the past 30 years. The Black Vein seam of coal is most remarkable and valuable, and from the quantity of gas given off, the inclination of the seam, the nature of the roof, &c., the seam is a very dangerous one to work. The writer has seen and worked some of the most dangerous seams met with in England and Wales, but none more dangerous than the Black Vein, at Risca. At Risca explosions occurred in this seam in 1846, when 35 lives were lost; in 1853, 10 were lost; and in 1860, 142 men were killed by a terrific explosion.

When the first explosion occurred naked lights were used, and afterwards the men showed great hostility to the general introduction of the safety-lamp, although the late Mr. Herbert Mackworth, at that time Government Inspector, declared that it was absolutely necessary to work the Black Vein exclusively with locked safety-lamps. After the explosion in 1853 some attempt was made to induce the men to work with safety-lamps, but they were not successful. They positively refused to work with them, alleging that they could not make a living without using a naked light to enable them to see sufficiently to work the coal, &c. Great care was taken with the ventilation at this time, large airways were made and kept open, and there was a fair but not very powerful ventilation. A furnace was the power placed at the bottom of the up-cast shaft, which was only 20 fms. in depth, or about that depth; the down-cast shaft was 73 fms. in depth. Small portions of gas often formed on the faces of the drifts, &c., and slight explosions in these faces were frequent. Some time after this a Struve's ventilator was substituted for the furnace, and this would no doubt increase the ventilation. After the explosion in 1860 the question of lamps was settled, the men no longer objected to work with them, and the system of double, or wide, stalls was introduced in the working, and this succeeded very well.

There is no doubt that the seam is a difficult and dangerous one to work, but, speaking generally, it is quite possible to work it with comparative safety. It has some peculiar features; the seam, as we knew it, varied in thickness from 7 ft. to 12 ft., and it was lying at a considerable angle, rising about 9 in. per yard, but there are many seams similar in those respects; the peculiar feature it has is this, the coal is very close-grained and hard, and I do not think that the coal itself gives off much gas, but the black shale, which lies at the top of the seam, gives off a very large quantity and very quickly as the coal is removed. When the pit was not worked for a few days the main returns were almost clear of gas, but when work was resumed (say) for two days the quantity of gas mixed with the air current increased very rapidly. This shows that only a certain amount of face should be in working, of course, in proportion to the total amount of air in circulation and the amount of air circulating in each distinct current of air. The mine ought to be divided into separate districts, each ventilated by a separate current or split, with an air crossing for each split so as to dispense entirely with doors. The ventilation of such a mine ought not to depend on the use of doors to direct the currents. Looking at the question in this light it is evident that any given amount of ventilation may not be adequate to prevent the fouling of the currents in some of them if the working faces are increased beyond a certain point.

Beyond the gas given off from the working faces from this black shale above the seam falls are of frequent occurrence, and when these falls take place in the roadways gas is given off in large quantities; the holes in the roof thus formed are often filled with gas, and the current of air passing beneath does not remove those accumulations readily. I have no idea what system is now pursued in Wales, that is with respect to the classes of workmen; where there are no deputies or regular officers who take charge of the districts of a mine, and the timbering, plate-laying, &c., is done by the coal cutters, the danger of accidents from explosions, &c., is vastly increased.

When overmen and deputies are employed, wastemen, &c., the manager has a staff of working officers under his command, and by this means he can not only secure the safety of the mine and the various districts in it but he can also enforce discipline amongst the men, and any infringement of the rules, such as tampering with the lamps, &c., can be more readily detected. Without such a staff of officers the crew in a pit are little better than a disorderly rabble. R.

## THE RISCA CATASTROPHE

SIR,—In the face of the dreadful death roll now before us, humanity might well ask if, in the management of the mine, any meteorological apparatus for indicating the approach of those atmospheric conditions that presage peril were employed, and if any effective signalling contrivances were in use for giving timely notice of sudden outbursts of fire-damp, &c. Explosions cannot possibly take place without first giving some signs that the gases below hold affinity to those above the surface, and so soon as contact is allowed to be made for electrical action of the forces, concussion must inevitably follow. By far the larger number of accidents in collieries are due to this cause than by the supposed carelessness in the use of safety-lamps on the part of miners, and not unfrequently there is less danger in the use of a naked light than the close proximity of a thunderstorm to the mouth of the pit, and it is here that a good conductor would be of service for disruption, ere what is considered generally good ventilation conducts the very elements of destruction to points of contact with an atmosphere charged with deadly and unmitigating intensity, of which the only indication of its existence is in the debris found in the sepulchral depths below.

I am urged to write you on this important subject as my attention has been arrested by the prospectus of a company now forming for the purpose of applying a system of electric telegraphs to mining operations, in connection with which it is intended to employ anemometers and other instruments for the constant and correct registration of force of draught and quantity of gas generating or existing in the mine, so that in the event of an excessive accumulation of gas in any part of the pit or workings instant notice of the same would be given, and the quantity duly registered at the pit's mouth. This in itself seems to me to be a good provision for future legislation in the management of coal mines, and if the company should introduce the electric light in lieu of the ordinary so-called safety-lamp, the success of the undertaking even in a commercial point of view cannot be over-estimated; for with the electric light the extinguisher could be applied in an instant, and illumination re-established when and so soon as found desirable. The importance of this will doubtless at once strike all your readers who may interest themselves in mining properties.

To my mind the introduction of anything tending to reduce loss of life should be met fairly and impartially, and with the application of the proposed company's plans the casualties from mining accidents must of necessity grow less. I hope, therefore, that we shall soon hear of christianity in its truest sense having at length strained a point and afforded this additional security to the poor miner, who at best is only hewing his own coffin. As the rising of the coming storm is now indicated and made known to us, so let the howl of destruction be recorded in good time, that widows and orphans may be unknown in our midst as relics of those who have been hurried to eternity without a moment's warning, or even a helping hand held out to save them. We have scientists of whom England might feel proud, and the result of their researches will, I trust, give rise for our special thankfulness in their having devised means by which sacrifice and destitution will no longer be attendant on the labours of such of our fellow-creatures as are patiently toiling in the vast dark depths, unaided, unheeded, and almost unknown, until their names are found inscribed on the scroll of those who have passed away.—Langham Hotel, July 20. CANADIAN.

## COLLIERY EXPLOSIONS IN SOUTH WALES.

SIR,—The explosion of fire-damp at Risca on the 15th inst. reminds us of the frequency of these accidents in the South Wales coal field. The explosion at Abercarne in Sept., 1878, causing 257 deaths, another at Dinas, in Jan., 1879, causing 63 deaths, is followed by that at Risca, entailing a loss of 120 lives. Many are anxiously awaiting the report of the Royal Commission, in the hope that the scientific and professional men of which it is composed may be able to provide a remedy against these lamentable events, for some more perfect system of working the mines is evidently much needed. In the Risca Mine we are informed 120 men were employed in the night shift, every one of whom seems to have met with a violent death, and that safety-lamps were used, examined when given out at the top, also at a point about 50 yards from the bottom of the pit. The quantity of air passing the fan is stated to be about 130,000 cubic feet per minute. If thoroughly distributed throughout the mine this seems a sufficient quantity to ventilate workings which are not probably of very great extent compared with some older mines in that and other districts. The ventilation being so ample, and the lights being protected, the question arises—How has this large quantity of gas accumulated to cause such an explosion? Its intensity of character may be judged of by the force with which it passed up both the upcast and downcast pits, killing one man at the bottom of the downcast, and damaging the ventilating fan at the top of the upcast. The explosion has been attributed to the effect of lightning entering the pit at the moment, but surely there must have been an accumulation of gas coincident with such a circumstance. The night overman reported that the workings of the mine were free from gas, and the fact of an inspection of the workings by two or three workmen a few days previous to this explosion, who reported also that the workings were free from gas; these facts seem to indicate that an accumulation of explosive gas was wholly unexpected, and a sudden issue must have taken place and in large quantity, and coming in contact with an unprotected light or an insecure lamp caused this explosion. It will be well if anything should be elicited in the inquiry that will be made into the cause of the explosion that will in any way tend to the prevention of such deplorable accidents, and the urgency of the remedy required must be felt by every one of our countrymen. OBSERVER.

## COLLIERY EXPLOSIONS.

SIR,—For a number of years the writer has pointed out from time to time through the Journal the risk that is run in connection with the system pursued in lighting coal pits. Explosions more or less disastrous in their results have taken place, but the cause has seldom been ascertained with certainty. Where blasting is a means used in getting coal the result of the investigation generally favours the theory that the use of powder has been the cause. Where blasting is not in vogue the result in the majority of cases is one of mystery. The most disastrous explosions have occurred in collieries which were said to be most perfectly ventilated, under the most careful management, and in which the proprietor has spared no expense to make all safe (vide Press reports of all large colliery explosions).

Taking for granted the correctness of this view, what then is the cause of these terrible disasters? I firmly believe that too little attention is given to details. The safe lighting of collieries is of equal importance to the ventilation of the same. It is not only necessary to have safe lamps, but most important that the system pursued in their use should be such as would assist in maintaining them so.

The experience of ten years spent entirely in following the subject of lighting collieries has forced upon me the conviction that it is difficult to alter the existing state of things mainly from the inability of those in charge to break down existing customs and overcome the prejudice of the men. That the loss of life by explosions arising from the use of lamps which, if illused (wilfully or innocently), remain lighted, can be tampered with, or which will not withstand the pressure of gas, or from the use of naked lights can be reduced to a minimum, is beyond question. It would take too much space to point out all the evils of many systems existing in connection with the lighting of collieries.

I feel, however, the time has now come when I ought to make a statement that collieries may be lighted with safety, and that there is such a thing as a safety lamp in the same sense as there is such a thing as perfection, at all events to the extent that its use in the pits

could not be the means of igniting the gas it might be brought into contact with; that the men could not tamper with the light, that the lamp could not be re-lighted without detection, and would stand any velocity of gas at any explosive point it is possible for a pit to give off under any circumstances.

In concluding my remarks, which may be taken exception to, I have only to say that I am prepared at any time or place (with due notice) to submit a lamp and system to any test to which a lamp can be submitted in a pit. Let me ask colliery managers in addition to attention given to perfection of ventilation, &c., to see that the safety lamps are of the best possible construction, and that the system adopted in cleaning, trimming, and inspecting them before they are put in the hands of the men is of the most perfect kind. A little more attention in these respects will undoubtedly tend to lessen the loss of life by explosions.

W. E. TEALE.

#### COLONEL SHAKESPEAR ON SAFETY-LAMPS.

SIR,—In the mining papers of March, 1879, Messrs. Ashworth and Smethurst, of the Garwood Hall Colliery, appeared on the question of safety-lamps, and a short correspondence followed between us, I recommending my "truncated cone" glass, which I had introduced two or three years previously. In the Transactions of the North of England Institute of Mining and Mechanical Engineers, Newcastle-upon-Tyne, issued May 14, 1880, Mr. Ashworth describes an "Improved Safety-Lamp" of his invention, and on page 149 he recommends his "truncated cone" glass in preference to the usual cylindrical glass, without having first obtained my permission. This is a cool proceeding on his part, and I should like to know whether those are the gentlemen to whom it appears the Royal Commission on Mines Accidents have delegated their authority, as if so we shall know what to expect from them, and may value their opinion accordingly.—*Baron's Court, July 22.*

J. D. SHAKESPEAR.

#### THE FUTURE OF THE TIN TRADE

SIR,—The world's consumption of tin for the current year is estimated by Mr. Edward P. White, of New York, at 44,200 tons, and the world's production for the same period at 35,000 tons, showing the excess of probable consumption to be 9200 tons. Now, inasmuch as during the coal famine in Great Britain in 1872 an estimated excess of consumption—which, however, never happened—of only 5 per cent. sufficed to about double the price of coal, it follows that Mr. White's difference of about 27 per cent. ought to increase the value of tin about tenfold, or allowing for some price below 9000l. per ton for tin proving prohibitory of the use of tin in certain industries, it would seem to be beyond question that any tin which could be secured for forward delivery—that is, for delivery on Jan. 1 of next year—at 2000l. per ton should be at once purchased. The total stock of tin in London on Dec. 31 was 14,833 tons, against 16,843 tons at the corresponding date of 1878. On June 30 the total stock was 13,191 tons, but the Metal Market Correspondent of the *Mining Journal* was careful to describe this as "public stock," it being well known that there is an immense private stock in the hands of speculators waiting to be thrown on the market, but which does not come into the ordinary statistics. The difference between 14,833 and 13,191, or 1642, tons represents the excess of consumption over production for the first six months of the present year; or assuming that the speculators' private stocks have been reduced to more than as great an extent, the total reduction may be taken at 3500 tons, so that 5700 tons out of Mr. White's 9200 tons excess remains to be provided for before the end of the year.

A more satisfactory prospect could scarcely be desired, and as Mr. White shows that the first six months American consumption was 7300 tons (the second quarters' consumption being but 200 tons below the first), and that there was a supply of only 8300 tons to meet it, his figures may be accepted as thoroughly reliable. The total stock, spot and to arrive, was 3875 tons on July 1, against 1725 tons on Jan. 1, and there was about 400 tons afloat from Billiton and Australia. He states that during the past six months the position of their tin market has become a most important one, not only to those interested there in its importation, distribution, and consumption, but also to all those connected with this article of commerce all over Europe. In fact, its importance cannot well be exaggerated, when we consider that whereas during the ten years ending with 1878 their annual consumption of block tin averaged about 5000 tons, their consumers absorbed during the year 1879 fully 9000 tons, of which more than one-half fell to the last four months of the year, commencing with the general improvement in trade at that time. This sudden extension forced American importers and dealers during October, 1879, to supply themselves rapidly from old European stocks, and to look out for increased supplies in the East, to avoid paying duty on indirect importations. Since October last year 85 per cent. of the production coming westward from the Malacca and Straits mines were secured for the New York market, besides fully 25 per cent. of the Billiton sales in Batavia, and the same proportion of the Australian produce.

It was rightly concluded, Mr. White remarks, that the American power of consumption would go on increasing during the present year, and these calculations were verified by facts. There was a cry raised of over supply, and it was stated that the Americans might at any moment have to force off from 5000 tons to 8000 tons of tin at whatever price Europe chose to take it. This naturally had (together with the collapse in iron and other metals) the effect of demoralising the tin trade in Europe, and prices were forced down in the London market from 1000l. per ton in early February to 680l. during early June. Immense sales of futures were made by operators before they had provided themselves in the East with the metal to make good their future contracts. While this was going on American prices, which from 21 c. per lb. at the beginning of the year had steadily advanced during January to 25 c., began to break step by step, in order to avoid being forced to take what London might throw upon the apparently over-loaded American market. The result was that by the end of May their price for Malacca, Straits, and Australian touched 15 c.; a few lots being thrown overboard mostly by some frightened speculators. These low quotations enabled holders of Billiton in bond at New York to replace the same with free tin, and to return the bonded article to Holland, and about 100 tons were shipped early in June. About the middle of last month the London market began to move; its orders in Singapore and Penang, together with those sent from America and China, quickly raised the price in six days from \$21 to \$26 per picul (nearly 25 per cent.) without securing any great quantity, and buyers for export then appeared in the New York market for large lines, which resulted in the purchase of 150 tons to 200 tons Straits at from 17½ c. to 18 c., equal to 84l. 10s. in cost. freight and insurance to London.

It would not at all surprise Mr. White to see European buyers taking away all that the New Yorkers are ready to give them at near present rates, so long as they are willing to undersell the producing markets in the East and in Australia, whence no tin can at present be imported below 19½ c. That such a position is most unusual cannot be denied, but taking the trouble to closely investigate the matter he finds the solution of this enigma in the law of supply and demand. He estimates the current year's production at:—Cornwall, 10,000 tons; Banca and Billiton, sales advertised, 8500 tons; Straits and Malacca, 10,500 tons; Australian shipments, 6000=35,000 tons. And in estimating the world's consumption he remarks that the United States during the first six months of the present year consumed of all kinds at the rate of 14,400 tons for the year; Great Britain and Holland (being double the six months deliveries of Banca, Billiton, Straits, and Australian), 21,300 tons; European consumption of English refined and common, less 1500 tons absorbed by the United States, 8500 tons=44,200 tons. He, consequently, finds as already stated that for the present year the world's probable consumption will exceed the probable supply by fully 9200 tons, and he adds that it, therefore, stands to reason that present stocks in London, Holland, and America will have to be encroached upon to a formidable extent before the close of the year. He reports, in conclusion, that prominent operators with keen foresight both in America and elsewhere, appreciating the salient points of the situation, entered the markets during the last few weeks, and bought heavily, thereby rapidly enhancing the value of the metal all over the world from 20 per cent. to 25 per cent.; and he anticipates that as soon as the general public

begin to appreciate the true position we may expect it to rise again within the next six months a further 50 per cent. over its present market value, and unless new sources of supply are soon discovered, or consumption generally diminished, we shall have to look forward to near those prices which ruled before the discovery of the Australian tin fields.

STANNUM.

#### THE MYSORE GOLD MINING COMPANY.

SIR,—With reference to the notice in the Journal of Saturday last, stating that the shares in the above-named company have been freely taken up, this is no doubt owing, in a great measure, to the influential directorate, and to the fact of Messrs. John Taylor and Sons, the eminent mining engineers, being connected therewith as managers, which is a sufficient guarantee in itself that the property may be considered a good sound permanent investment.

SHREANSEA.

#### ALMADA AND TIRITO SILVER MINE.

SIR,—Persons interested in mining know that the market price of shares is no criterion of their real value, and this is especially true of the price quoted for the shares of the above company, and correspondents have from time to time commented on the fact. The recent half-yearly meeting, as reported in last week's Journal, disclosed a greatly improved state of affairs. The profit for the half-year was 2377l., as compared with a loss for the same half-year to Dec. 31, 1878, of 3422l. During this year the price of silver has steadily risen, and the full advantage of that rise will be received in the next statement of accounts to June last, which will most certainly show a large profit, and I for one look for a dividend, small it may be, but surely the precursor of a bright and prosperous future. The capital is not excessive, is in 12 shares, fully-paid, and the company is limited under our Companies Acts. Special funds for explorations are now being provided by the issue of 10 per cent. debentures, forming a first charge on the extensive properties of the concern, and most amply secured. The mining prospects have greatly improved of late, and there is a reserve of ore actually laid open sufficient to last for the next 18 months without making further explorations. The appliances for treating the ores, both green and black, are of the best and most complete kind, and I believe the manager, Mr. J. H. Clemes, is both honest and capable.

I know no concern with better prospects of success—hardly struggled for and well deserved—and at the present low figure of 8s. 9d. the shares are a capital speculation, and are certainly better worth 17s. 6d. per share than when they stood at that figure in February last.—*Dublin, July 21.*

A LARGE SHAREHOLDER.

#### GOLD IN WALES—No. XXVI.

THE MAWDDACH VALLEY, MERIONETH—(SWITZERLAND AT HOME).

SIR,—Since my last communication on the interesting subject "Gold in Wales" a good deal has happened to alter some of the older notions respecting it. I propose, therefore, with your permission, to say a little more about it, and to treat of the upper portion of the "charming valley of the Mawddach" in particular, taking up the thread of observation exactly at the "puzzling" point where I left it.

To be rigidly orthodox perhaps I ought to recommence with something like "settled views of the geology of this hitherto puzzling locality." Unfortunately, the published maps of the Geological Survey of this portion of North Wales are very considerably at fault. In addition to this there is the melancholy fact of diversified opinion prevailing amongst certain geologists of the day as to the relative ages of certain of the rock masses hereabouts.

Generally, as I have before stated in this long series of letters, the rocks have been taken as Silurian and Cambrian; but Dr. Hicks, F.G.S., and others hit the mark, I think, when they treat the Upper Mawddach as of pre-Cambrian age. Whether this has become "settled geology" or not seems to me of but small importance, compared with their very interesting mineralogical conditions. As I have said elsewhere:—

I am quite content to leave the exact order of superposition of these rocks in the hands of special geologists, and will briefly state that the hand-specimens I have collected show:—Black micaceous and talcose schists; black and green shales; hard dark-grey felspathic ashes and cindey-looking uncleanable (for the most part) slates; Lower Silurian of the Survey; black slates (Upper Cambrian or Lingula flags of the Survey); felspathic and trappian grits; hard coarse sandstone; rough schists, shales, and slates (Lower Cambrian of the Survey). Portions of felspathic lava beds; striped cinder beds (both chloritic and mixed with grit and sandstone); spotted, blotched, felspathic, sedimentary, and interbedded trap rocks; bits of ash beds, yellow clay, elvan, flookan, and quartzite. The usual intrusive greenstones of the Survey, which are green, grey, and reddish in colour, fine, medium, and coarse grained (often very coarse grained), prominently quartzose and prominently hornblended; also diabase and diorite, and the magnificent uranite porphyry.

The minerals include compact and crystallised barytes, calcite (sparingly), orthoclase, chlorite, black hornblende, white scaly mica; white, yellow, ferruginous, calciferous, auriferous, plumbiferous, zinciferous, cupriferous, and pyritic quartz, with the cherty (hornstone) variety abounding, and which is often powdered (so to speak) with extremely fine gold, all of which is so light that it will float on water. Talc also occasionally, and uranite. Native gold, silver, antimony, and copper; galena, copper pyrites, iron pyrites, mispickel, marcasite, rhodochrosite, tetrahedrite, polytellurite (of D. Forbes), pyromorphite, blende, stibnite, senarmontite, berthierite, apthionite, earthy malachite, platinum, titaniferous (of D. Forbes), &c.

It is not, perhaps, altogether surprising that this miscellaneous mineral catalogue should suggest the idea of difficulties almost insuperable in the way of their successful treatment for the precious metals, and for gold in particular. They are, therefore, too hastily considered by some as being "below commercial consideration." One oracle has spoken—"Gold in Wales is held totally beyond the cost of production" (whatever that may happen to mean). Others have all along thought differently, although until recently unable to prove it satisfactorily. No doubt it requires courage closely allied to obstinacy to keep up a continuous fire against such foregone conclusions, and with what have so long appeared to be insurmountable difficulties. The difficulties, most of them, however, have at last very nearly vanished.

It may be "settled fact" that by far the larger portion of our national area is non-auriferous. For one I by no means subscribe to any such notion; at present nobody is in a position to prove it. It is, however, a "settled fact" that many expressed opinions on the subject of gold in any of its states or conditions have originated with persons who move in very small circles of observation, and of whom the mounted toy bicycles of the Bank precincts may be taken as a type. The riders never by any chance get out of their little circumscriptions. They never care to get out of them. They go round and round on their noiseless nuisances. That is all their circle reasoning; therefore, it is merely trifling with the subject, without saying anything seriously to its detriment.

A word or two on another tendril of this delicate subject. Tracing "the origin of metallic deposits" has become a fashionable mode of recreation of late; and I must confess to swaying to and fro with the clever theories that have been propounded, not the least interesting of which is the caverning action of heated waters, making holes in rocks for deposits of metals, held mechanically, or otherwise, or both, by in-flowing waters, &c. They may all be fact on particular occasions. Yet, notwithstanding all that has been put forward in this luxurious speculation, it must be said to remain in anything but a satisfactory position. And, as regards the precious metals themselves, investigations as to their origin have by no means cleared the course of observation. Even the states and conditions in which the miners find them are but very imperfectly known at this very hour. We know this much, however, that generally they occur in states of exceedingly minute dissemination; and that for the most part these "Royal Metals" seem not over particular in the choice of their company. They are less often seen associated with titled minerals of the highest order than with never-to-be-named mineral admixtures, some of which demand the very "nicest methods of analysis" to determine their "Royal" presence. These associations often appear to be states of incomprehensible confusion.

It has just struck me, amusingly, that there is a singular analogy between the modes of occurrence of gold and silver in their hiding places in the rocks of the latter, and their very varied distribution in the pockets of the human family.

Perhaps it may be news to some of the little circumferencers alluded

to that gold is the most widely-distributed of all the metals, and that no clay substratum, or sea beach, or sea water, or river water, probably, on concentration, will refuse to yield a gold trace, or much more than that, occasionally to the diligent patience of the gold seeker. Yet the gold distribution is marvelously unequal. How gold gets into such localities is pretty easy of explanation, and why it stops there is not very difficult to guess at, for this partially happens from the non-oxidising nature of the gold, so that, in fact, it lasts longer in its resting places than would any of its former associates which happened to have been very likely of the oxidising class.

Here we have nearly all that is known on this head, although possibly we may not be far off a revelation of new and startling facts in connection therewith. I have some solid reason for believing that we are very near this desiderated period. Happily, we have entered a phase of mineralogical science in which professors and some others of eminence evince the courage of ripe thought of their own—who dare to let go their older prejudices, and to speak outright in plain honest English, "I do not know." Undoubtedly this is the first grim step that has been taken in the direction of an earnest approach to the states of the unknown in mineralogy. Be pleased to read a few examples:—Why (in Nature) gold and silver are almost always inseparable companions? Why, if what are called the non-metallic minerals, gold generally prefers silica (in some of its states of being) as an associate? and why silver prefers calcite? Why gold likes iron, sulphur, arsenic, &c., in various combinations? Why silver should have such a partiality for lead, especially in combination with sulphur? Why a natural alloy of gold and silver (electrum) when in quartz should at times be subject to a mysterious formation force, and protrude itself from the surface of its matrix, which is in a state altogether apart from decomposition of any kind? Why curly-wig-like extrusions of silver are to be often seen from a silver sulphide distinguished as argentite? Why copper will exude from quartz, &c., and afterwards crystallise.

In another place,\* three years ago, I ventured to call these spontaneous and often rapid extrusions by the innocent little term "growth," and growth it is, although there is as little publicly understood about it by scientists as of "the genesis of relative occurrences" of one of the objects to the poor little thing's introduction to mineralogical phraseology.

I am not aware that it has yet been "authoritatively declared" whether there be a silicate of gold? As to silicification of gold it seems difficult to account for assay heads of gold sometimes containing silica, unless there be some such natural combination. There is chloride of gold, in art which is very soluble in water, and from it gold can be precipitated by iron sulphate or metallic gold, or by sulphuretted hydrogen as sulphide of gold. I have been confirmed in my belief that gold, hereabouts, is never found in a state of purity, but is always more or less alloyed with silver, copper, tellurium, bismuth, antimony, nickel, or arsenic, or with two or more of these prevalent metals. It is certainly often found mysteriously and intimately associated with metallic ores containing sulphur, zinc, lead, copper, iron, bismuth, &c. In such "common, natural ore conditions," since the death of my obliging friend, David Forbes, I have known of nobody who takes the slightest investigating interest, *con amore*.

\* True it is: pity 'tis, 'tis true.

That there exists a natural silicate, arsenide, sulphide, and bismuthide of gold I am very nearly sure of, heterodox as it may seem. I am, however, quite certain of gold tellurides allied to Genth's Calaverite (au Te<sub>2</sub>), and Krenner's Bunsenine (now called Krennerite), although the tellurides are neither of these—that is, according to the descriptions I have read of these minerals. (More of this anon.)

Many of us have been accustomed to speak glibly, if not knowingly, of "normal conditions," and the like of minerals, without doing much more than breathe out expressions that carried neither thought nor meaning, as I have said before in your columns. Perhaps it is hardly safe to say that a mineral under observation at any time is in a "normal condition," for most analyses disclose the presence of substances thought to be foreign to the chemical composition of the respective minerals analysed. In short, it is not clear that we actually know the "original," "normal," or "ordinary" conditions of any mineral whatsoever.

Adverting to "mineral growth," as I have described it (or whether called by any other name, in Greek or German, no matter), it will force itself into mineralogical notice, whether certain savans approve or disapprove. It will soon cease to be "an impropriety of expression." It has ceased to be so, nearly.

Pardon a few steps more on this tender ground, and allow me to say again what I have before said. A natural continuity of transference of mineral substances into vegetal matter in the production of new growths, forms, and shapes is a fact universally admitted; and I submit that it has yet to be shown whether there is not, also, a similarly varied continuity in mineral metamorphoses, inasmuch as these are evident nearnesses of relationship betwixt abnormal arborescent, plumose, and other metallic shapes, and some of the lower vegetal appearances.

It has been suggested, as possible, that one of the results of the visible decomposition of a compound may be the generation of a kind of "formation force" in one of the substances contained in it, somewhat analogous to "vital force." Some such force may really be, but assuming it to be, it will only partially explain the exhibited phenomena. There will remain unexplained the distinctive metal growth from undecomposed or "normal sulphides," and more extraordinarily still, those growths from what appears to be pure silica in a "normal condition," unassociated, as far as is known, with any other metallic substance. By process of negation the cause or causes of these mineral alterations may be pushed somewhat into a corner for determination. For example, under the known circumstances of these changes the action of water cannot be said to have had any influence; of gaseous influence none can be imagined. There is a total absence of the usually observed effects of heat. Atmospheric influence is barely possible. Light, potential in plant movements, somehow possibly may be an aid in mineral movements or "growths." A latent electro motive power is also possible. No acid appears to have been concerned except silicic acid, and that in the solid condition of quartz, in some of the phenomena.

This leads us up to the idea that sometimes such growths derive their accumulating or aggregating particles from metal contained in the quartz matrix in a fluid state of infinite rarity, and as yet imperfectly understood, if not altogether unknown. The last idea is possible connection with electro-motive power of some kind may be ultimately found amongst the causes of such "abnormal mineral conditions." The extraordinary bristling behaviour of some sorts of magnetic iron ore gives almost life-looking phenomena; the inherent force truly is called magnetism, but that is not saying much. But seeing such palpable extrusions and mineral gymnastics under my own eye makes me an apologist for other so-called "common minerals," and claim for them the possible possession of occult forces, by means of which a continuity of recreation is going on, slowly or rapidly, as it may happen. So, therefore, it is quite possible that worthless-looking waste heaps of the old men may ultimately be found of great value. But I have written on this subject several times at great length, and the facts have been since verified in many places.

I will now proceed to summarise certain of the commonly known and some new mineralogical facts of the Mawddach Valley:—

In the first place it is well known that the mineral lodes of Merionethshire (particularly of what is called the Dolgelly district, about 20 square miles to the north of the turnpike road leading from Dolgelly to Barmouth) are very numerous, and that, for the most part, they can be inexpensively wrought for the metallic ores they contain. Nearly all these quartz lodes are conspicuously productive of copper, zinc, and lead ores, which are frequently rich in gold and silver, both in a virgin state and in certain states of combination, which until very recently have been only doubtfully recognised, and not in the least appreciated as being of commercial value. An ore of copper (chalcocite or copper pyrites) is, perhaps, the most abundant of the metallic minerals; next after this an ore of zinc (blende or sphalerite), then an ore of silver-lead (galena or galenite), nearly all of which are more or less intimately associated with sulphides of

\* "Mineral Growth at Ordinary Temperatures, under Ordinary Conditions."—*Min. Mag.*, No. V.

iron—such as pyrites, mispickel, and marcasite—with sundry metallic admixtures, &c. Copper pyrites of this district has assayed as much as 20 ozs. of gold to ton; blende, 400 ozs.; galena, as much as 29 ozs. of gold and 300 ozs. of silver. Some of the abundant pyritous minerals have assayed 19 ozs. of gold to the ton.

A silver ore (polytellite) has assayed 3528 ozs. of auriferous silver to the ton, and this alloyed silver on parting yielded at the rate of 30 ozs. of gold to the ton of ore. In addition to auriferous copper, zinc, lead, and pyritous minerals, quartz is frequently found associated with telluride of bismuth (tetradymite), &c., which is quite as rich as minerals of this class generally found in Australia, California, and elsewhere. At a well-known mine in this district, for example, 39½ tons of the ore gave 9363½ ozs. of gold, which was sold to the Bank of England for nearly 30,000*l*. At another mine nearly 2000 ozs. of gold were obtained from about 4000 tons of quartz lode, almost free of metallic sulphides. Indeed, it may be safely asserted that there is scarcely a quartz lode of the district that is not auriferous. Still gold is found in a great number of small lodes which can never individually pay for working them, but which collectively will pay very well. It frequently happens, however, even where virgin gold is actually visible in the lodestuff that either attendant natural conditions are unfavourable for economic working, or the quantity of auriferous mineral obtainable is insufficient to warrant the erection, conduct, and maintenance of special reduction-works. More general systematic exploration may possibly modify this view; but, as the case stands, there is a large area of auriferous ground which is valueless, and will remain so until brought somehow into associated operation, both as regards the efficient testing of these mixed minerals, and also their reduction on a scale comprehensive enough to afford the necessarily heavy cost of skilful and thorough administration.

London, July 12. T. A. READWIN, F.G.S., &c.

[To be continued in next week's Journal.]

#### MINING IN LLANARMON.

SIR.—Legitimate trade appears once more to have emerged out of the clouds of uncertainty that prematurely enveloped its numerous ramifications a few months back. Like our atmosphere it has of late abounded in much foreign matter, and been subject to sudden and sensible changes, which I trust will assist to purify its atmosphere, so that life and activity will henceforth be the natural healthy result. The prospective is encouraging, and if adventurers will only sustain this healthful equilibrium by a careful and judicious distribution of the forces at their command we can look forward to an era of prosperity much to be desired. In making the few general remarks I propose doing on this district, I must admit of being an interested person in some of the mines under notice, but, nevertheless, I trust that no one will have occasion to condemn me for trespassing over the most strict line of impartiality.

There are many places in the district well worthy the attention of the enterprising public. Some that are associated with the days when to make a million of money was a prize of but small comparative importance; others there are of less antiquity steadily advancing through the many vicissitudes of a mining life to a rich maturity. These two classes are well represented at the following places:—Nant-Adda, Lady Ann, Nant, Bryn-y-Mwyn, Westminster, Plas-Du, Bodidris, Llandegla, Lead Era, Bryn Alyn, Belgrave, Pant-Du, East Pant-Du, Truro, and Maes-y-Safn, and with your leave, Mr. Editor, I will herewith proceed to notice them in the order they are down.

NANT-ADDA (in English, Adden's Dingle).—How it secured this name I cannot say, unless Adam Jones, who was a Welshman, shortly after being expelled, thought it a rather pleasant place, possessing in some respects features that reminded him of his former possessions. To the west the ground rises gradually to the top of Foel Famma (the Mother of the Hills), 1500 ft. high, forming a part of the Silurian ridge that runs from Llandegla to about two miles north of Talargoch Mines, separating the Vale of Clwyd, with its beautiful and varied scenery and diversified but interesting stratification, from the smaller but not less interesting and valuable Vale of Llanarmon. To the east are the rugged ragged rocks of the Carboniferous limestone with their mines and minerals, rising rather rapidly to the height of 200 ft. Between, the River Alyn gently flows along a serpentine path, placidly making its way to the Dee.

Into the hill at this point an adit level has been driven 330 fms. into the western bearing zone of the Carboniferous limestone. It is well arched, and of good size, and was not driven this length under 4000*l*. The first lode intersected is the Nant lode, 120 fms. from the mouth. This lode produced 180 fms. east some hundreds of tons of lead ore; 540 fms. east, between the years 1842 and 1849, 3600 tons; 960 fms. east, between the years 1842 and 1867, 13,360 tons; and there is sufficient evidence extant to presume that this represents but a minimum when compared with the whole amount extracted at different times from this gigantic lode. Having followed the course of this lode for 90 fms., and meeting with occasional deposits of galena, a cross-cut was driven 30 fms. to the Brynhaidd lode, which it appears was much more productive (I attribute this to the cross-cut having cut the lode in the proper bearing zone, which is a few fathoms east of the present end, on the Nant lode). On this 60 fms. have been driven. The end is now immediately under the outcrop of a strong course of ore, that has been followed until prevented by water from surface, and it is anticipated that by extending this level 60 fms. it will be in this run of ore. The following letters I received from the undersigned, with their permission to publish them:—

SIR,—I was the last that worked at this mine (Nant-Adda), and for the last 2½ years four of us worked upon a course of ore, and paid all the expenses of the mine. The lead averaged from 6 in. to 2 ft. wide. I have no doubt but that this is the top of a run which has gone down under the level. We sunk a sump 4 yards, and every hole we put broke lead.—DAVID HARRISON: Cross Keys, Llanarmon.

SIR,—My father worked at Nant-Adda, and rose some hundreds of tons. He was rising splendid ore when he stopped, which he was obliged to owing to water. He tried for support to drive the adit under his old workings. He was positive that when his working would be reached they would have a rich mine. I saw lead with him in the ground 5 feet wide solid.—GEORGE JONES: Brynhaidd, Llanarmon.

In my efforts to secure authentic information concerning places that have been abandoned nearly 30 years back, I am assisted by such disinterested parties as the above, whose present position claim for them credence and respect.

BRYN-Y-MWYN (Llanarmon).—An important discovery of lead ore has been made at this mine at two points; one in a new lode parallel with the Nant, and the other in the Pant-y-Gwlanod lode. Both are believed to represent fresh runs of ore. J. A. EDE.

#### CARDIGANSHIRE MINES.

SIR,—Your correspondent, Mr. Charles Williams, in last week's Journal, refers to Blaen Caelan, and I am pleased to note that he holds the same views as myself as to the Esgair-hir lode passing south of the Caelan brook into Blaen Caelan from the Cambrian Company's sett. The old workings referred to have been obliterated on the back of the lode, and our cross-cut is driven to intersect the lode. Assuming the underlie to be north 1 ft. 6 in. per fathom, we should be very near to it; it may not prove immediately productive, and require extension east and west upon the lode. I shall be glad to avail myself of the offer made to "A Shareholder," although I am not the writer of the letter in the *Mining Journal* of July 10, and at the same time thank Mr. Williams for placing this real knowledge at the service of the Blaen Caelan Company, and am sure the favourable view he expresses as to the value of our mine is well founded. A very little further rise in price of lead will put Blaen Caelan into your Dividend List.

The Great Camdwr Mine has been referred to both by Capt. Williams and Mr. Thomas Jenkins in recent letters in the Journal. It is a surprise to me that a sett which possesses such a magnificent lode several fathoms wide has remained unworked. On one portion most valuable deposits of manganese are to be seen, and the recent rich discoveries of lead at Bryn Aroa should ensure the Great Camdwr a good start; it is on a well-known lode worked upon at Bronfloyd and Vaughan Mines to the west, whilst east it enters into Montgomeryshire in the direction of the Van. A deep adit level could be started near Droggol House, which would make this at an early date a prize. There is no doubt of great mineral wealth being found there.

Another correspondent mentions this district as likely to have a tramway promoted. No better route could be selected than from

Llanfihangel Station via Talybont, Havan, and Henflewch, and passing by Droggol into Montgomeryshire would open up a good mineral district. Splendid slab and stone quarries would be opened out, and much land now in sheep walks at 1s. 6d. per acre would be brought into cultivation. Besides, still more extensive tracts should be planted with larch, which thrives so remarkably well on these hill sides, and whilst improving the climate would benefit everybody.

Blaen Caelan, July 22.

JONATHAN PELL.

#### CARDIGANSHIRE MINING.

SIR.—There are few mining districts more consistently and fully kept before the public as that of Cardiganshire, while on the other hand there are few mining districts where a stranger is so much at sea for want of a proper geological guide. It is true we have the Ordnance Map, but that has been executed long ago, and before many of the lodes now being worked were discovered, and it is also on such a small scale as to be of but little value to the practical miner in dealing with isolated setts. We have also Capt. A. Francis's hand-book and map, which merely as mining directories are useful. Then there are Capt. C. Williams's letters, which give rough sketches of considerable interest from a practical point of view. In years gone by we also used to be treated to a great variety of mining views from the versatile pen of Capt. Sampson Trevethan, M.E., C.E. And, by-the-way, what has become of the late Uncle Sam as he used to be familiarly and kindly known? Now, could not these three luminaries of Cardiganshire mining be induced to put their heads together and compile a geological map of the county on a suitable scale with sections through the principal mineral districts. If they were to bring their great experience and talents to bear on this subject it would be a lasting monument to their fame as practical miners, and would be the means of promoting legitimate mining in a county which is undoubtedly rich in minerals, while it would also remove the stigma now more or less justly applied to Cardiganshire miners of being ignorant and regardless of the geological conformations of their mineral districts.

There are many valuable mines in Cardiganshire and many more poor ones. There are here champion lodes which can be traced for miles and miles. But these great lodes when attached, regardless of such experience as is only possessed by a few local experts, prove too often ruinous speculations. It is a strange fact that in Cardiganshire you scarcely ever find two valuable mines consecutively or conjointly on the same lode or group of lodes. There are plenty of instances to the point, but take the Ystwith valley for one. There is Grogwinion, Frongoch, Grogfawr, Glogfach, and Cwmystwith, all valuable mines, but you do not find immediately east or west of any one of these mines (as far as my memory serves me) a single mine of any value. When, therefore, a Cardiganshire mine is recommended for its being on a certain champion lode, and adjoining a certain valuable mine, I always consider the recommendation to be fatal to it. A phenomenon of this sort which has been repeatedly proved in practice is surely to be accounted for geologically, and this is the subject I should wish to see the gentlemen I have referred to take earnestly in hand.

NEMO.

#### EAST CARADON MINE.

SIR,—A report was circulated some sixteen or eighteen weeks since that a lode (called the South Caradon lode, and which was known to run into this sett) would in from five to six weeks from that time be cut in this mine. On the strength of such report many shares were purchased at a high price per share. Can any of your readers inform me as to such lode—i.e., whether or not the same has been cut, and if so, the nature thereof; and if not, the length of time now required to attain that object? Further, what are the future prospects of the undertaking; and can any reason be assigned for the depreciation in the price of the shares? Any information would oblige—

A SHAREHOLDER.

#### ANOTHER GLANCE AT GWENNAP.

SIR.—There are some persons who freely express their opinion that Gwennap, as a centre of mining operations, is effete. They say that all the profitable mineral veins have been exhausted of their contents, and that to go any further in pursuit of mineral wealth in that parish would be a waste of money. In support of their theory they quote Clifford Amalgamated, Poldice, Wheal Damsel, Tresavean, &c., which embrace a large area of the parish, and which were the best mines in it. I am disposed to agree with them that it would not be wise to re-open either of those mines, because they were abandoned by companies who fairly worked them to a great depth. Poldice, I believe, did not yield mineral enough to pay its costs for 30 or 40 years before its abandonment. To put up machinery to try it again would be a certain waste of capital. I have no doubt that Poldice was rich when in 1748 the grandfather of the late Mr. J. Williams, of Scorrier, commenced the deep adit, sometimes called the Poldice adit, and sometimes and more generally the County adit, otherwise it is probable he would have had no heart to go to that expense. Clifford Amalgamated is too deep to warrant the outlay of 40,000*l*. or more in draining it, but the debris lying at the surface, according to the analyses of Mr. J. H. Collins and others, would yield copper and other metals in paying quantities. I understand that leases have been taken from the lords for the purpose of enabling the lessees to put the stuff under treatment. I expected to see ere this the needful appliances in working order for that purpose. The minimum rent is current. As to Wheal Damsel, which yielded 200,000*l*. profit, and Tresavean, which yielded about 250,000*l*. profit, they should also be let alone. Wheal Jewell, also, which yielded 300,000*l*. profit, should stand idle.

Dismissing from our consideration those mines and all of like description, I think that it can be shown that Gwennap is very far from a state of exhaustion. North Penstruthal is a shallow mine, and contains several lodes of good promise, which are likely to yield profits at no distant period. South Penstruthal yielded about 100,000*l*. from shallow levels, and it is not a deep mine now. The first working commenced in or about 1825, and ceased about 1835. The last working under Mr. John Little and party, about 20 years ago, was not a fair trial, because they did not sink through the bed of mundic, which is at the bottom. If they had done that it is highly probable that South Penstruthal would be a dividend mine this day. The present company will act more wisely, I dare say. At the eastern side of North and South Penstruthal is a piece of virgin ground through which several lodes pass from those mines, and to test them there would be fair speculation. This piece of ground should be annexed to Bell Vein Mine, which is now a small sett. Comfort and North Tresavean is a good property, likely to become very profitable from what I heard when at Lannarth a few days ago. Treviskey, Trehellan, and Brewer should stand still. Carnvannel has not had a thorough fair trial; Capt. J. Lyle worked it 30 years ago. East Wheal Buller, lately commenced by Capt. Tregay, I have heard a good account of. The sett has been very slightly tested, except in the western part, where Messrs. Williams and Co. had a pumping-engine, &c., and where it was very poor except for a few days, when copper was cut, which had an ephemeral existence. On the slope of Carnmarth towards Comfort very little mining has been attempted. On the northern, eastern, and western sides of the same mountain there is a large area of unexplored ground. There is also on the southern side of Cosgarne some unexplored ground. There is a very shallow old mine called Recover—the fault south-east from Clifford Mine, which has not been touched I believe for 100 years. West Poldice, commenced by the late Sir F. M. Williams, Bart., and now in the hands of Capt. Teague and Co., is likely to be very profitable. Capt. Teague has a rule never to enter upon non-paying mines. Treskerby Mine, which yielded good profits, and which was abandoned in 1828, is not deep, and warrants further exploration, but I doubt whether it will be attempted, because Mr. G. Williams, the proprietor of Scorrier, through which one or more of the lodes pass, we may be almost sure, will never consent to have the land broken up.

There is a lode running through Tregullock up for the same reason. From Treviskey all the way down to Bessow—three or four miles—little has been done in the way of mining. Trevice Consols is partly in Trevice, the land of Mr. E. B. Beauchamp, and partly in Cosgarne, the land of Lord Clifford and others. This is said to be a promising mine, and is being worked by Captain John Mayne and Company. I intend to visit Gwennap next week, when I

will call and see this mine, that I may find a subject for another letter on mining in this celebrated parish. R. SYMONS.

Truro, July 21.

#### MINERAL CORPORATION OF GREAT BRITAIN.

SIR.—The statements concerning this company contained in your City Article of last Saturday are absolutely untrue. No such proposals as the writer mentions for giving fresh capital have ever been made to the board from any quarter whatsoever, and at no meeting of shareholders, either in Paris or in London, has any proposition been made for any investigation of the accounts or special inspection of the mines. Nine-tenths of the information, for the elicitation of which your writer has indicated such a complicated and expensive machinery, could, if wanted, be obtained in a few minutes by any shareholder who took the trouble to look at the books and audited accounts of the company. I am instructed to request the insertion of this contradiction in next Saturday's Journal.

London, July 18.

H. E. VICKERS, Secretary.

SIR,—I notice in last Saturday's Journal some statements concerning the Mineral Corporation which have been drawn from a completely erroneous source. It is absolutely false that at any meeting, public or private, of the French shareholders there has ever been any question of giving a mission to Mr. Attwood to inspect the mines, or of verifying the accounts of the company. The calumnious insinuations which your article has published, and against which I can scarcely protest with too much energy, in my own name, and in the name of my French colleagues, acquire from the publicity given to them in your Journal a special gravity, and, therefore, you will not be surprised if I request you to give me the name of their author. As an immediate correction, I beg you to insert this letter in your Number of next Saturday.

Baron C. BARDIN DE CREVECOEUR.

Rue St. Georges, Paris, July 19.

#### GREAT CAMDWR MINES.

SIR.—Having been connected with mining both to the east and west of this property (Dyfnwgwm, Cafarthia, and Havan) I can bear testimony to the very fine lode passing through it, which is the Dyffylle lode, which after passing through the two first named mines goes straight to Camdwr, and then on to Darren, Bronfloyd, and other mines. Great Camdwr has not been worked within my memory, therefore I can say nothing with regard to the underground prospects at the old mine beyond hearsay, which, however, seems pretty unanimous on the point of the old mine having been very rich in the bottom, and only left through being so close to the boundary, and the pumps being also overpowered. The indications, as seen in several surface trials, are very promising. At one point a fine course of lead ore, worth 1½ ton to the fathom, and in another a very fine gossan of great width, intermixed with a rich deposit of manganese, which in itself is of good commercial value, but which in my opinion is only the outcrop of a great deposit of copper underneath, to get at which a deep adit ought at once to be started. I have not the slightest interest in the mine, but I have often wondered why such a progressing property was lying idle.

EVAN RICHARDS.

Morben Hall, Montgomeryshire, July 20.

#### WHEAL CREBOR.

SIR,—I should not have felt called upon to again refer to the above mine but for the peculiar manner in which the Messrs. Watson Brothers replied in last week's Journal to my letter of the 7th inst. Facts are stubborn things, and require more than insinuations and innuendoes to refute them. The statement I made, to the effect that it would require a year and a half to bring the new shaft to the 120, that both ends at the 120 had fallen off in value from 80*l*. per fathom to 20*l*. and 15*l*. respectively; that the so called new lode is in reality the main lode, which for about 40 fms. in length was passed by, the drive being made on a north branch, which for nearly the entire 40 fms. was in unproductive ground. That the point where the branches split, and also where they again join, are plainly to be seen; that the 108 has been driven for the last seven or eight months in totally unproductive ground; that the two branches are together and are poor at the 72; that the position of the vases sunk in the bottom of the 108—new lode—and character in them show conclusively that the ore does not hold down at these points, together with several others in regard to points in the mine and mode of working are uncontroverted and unanswered. Neither Messrs. Watson Brothers' strictures on my motives for so writing, nor their insinuations in reference to the shares of this mine having been "beared," not so far from Horrabridge, alter the facts of the case. The statement that if my intentions were so philanthropic there are other mines to which I might turn my attention is equally wide of the mark, as also is the question as to whether I had ever inspected the mine.

The last paragraph of my letter expressed a desire on my part if anything I had written were not correct to be put right in the matter: surely, then, it would have been easier and more to the purpose if these statements were incorrect to have simply denied them than to try by raising side issues or criticising motives to draw attention from the point at issue. I leave it for the public to judge which of us has the better case.—Horrabridge, July 21. THOS. TREMARTH.

[For remainder of Original Correspondence see this day's Journal.]

#### THE AURIFEROUS QUARTZ REGIONS OF SOUTHERN INDIA.

The energetic steps taken by the Indian Government under the late Ministry to verify the glowing reports of the mineral wealth of the South Wynaad, by appointing competent Australian gold mining engineers to inspect and report, had the good effect of causing British capital to be directed to the district, and already several English companies, with ample capital, are engaged in the erection of the necessary machinery for getting the lode to market. But this is not the only benefit which is likely to accrue from the movement, for already the more northern district of Mysore is beginning to receive attention. With reference to the latter district, Mr. A. Hay Anderson, of Glendee, in the Wynaad, has just published an interesting pamphlet (London: Blackwood and Sons) which is likely to prove of great utility to intending investors. He believes the reefs and regions in the Mysore province, which is considerably further north than the Wynaad, to be richer than those which have hitherto been receiving attention, and points out that with the present means of communication either the Wynaad or Mysore could be reached from Edinburgh or London in four weeks.

The Colar gold fields, in Mysore, are the more easily got at, as, landing at Bombay, rail can at once be taken for Madras. The mail train starts at 2 P.M. To an Indian traveller the first part of the journey, to the foot of the Ghauts, is decidedly uninteresting; but the journey up the Ghauts is magnificent, the ascent and zigzag one of the grandest railway passes and pieces of engineering of the day. Before daylight on the fourth day, Colar, 40 miles from Bangalore, there one gets almost, says Mr. Anderson, at once to the auriferous quartz regions—the regions where the pioneers of Indian gold mining have been for years prospecting and working, developing slowly but surely the resources and riches of that district. We confine ourselves first to a bare statement of facts—of stone actually got, reefs actually seen and prospected over, and actual results. One reef in this district has been more thoroughly tested than others; from 9 tons of stone taken out at 80 ft. depth 27½ ozs. of gold were got, stone taken out at another part, and at 18 ft. depth, gave at the rate of 1 oz. 3 dwts. per ton, and at 50 ft. depth 4 ozs. 13 dwts. per ton. From that reef, and near the portion last tested, some 300 to 400 tons of stone are now ready, waiting the arrival of stamping and amalgamating machinery from Australia. The stone is a dark grey quartz; the gold in it is in very fine particles, and is diffused throughout. We can well imagine that within a year or two mine after mine and company after company will be busy at work all over that district. Capital and machinery are essential there as well as in Wynaad.

In conclusion, Mr. Anderson states that even in 1866 the facts about the past mining works—the great facts of the enormous extent of country and depths of veinstone left untouched, even in the

Wynaad—were but little known or recognised, really scarcely known at all; and so the point, for the locality of Ophir, missed, Wynaad being in close proximity to the Malabar coast; in fact, the Malabar coast ports, Calicut and Tellicherry, being then, as now, the shipping ports for both Mysore and Wynaad. Then in "Travels of Marco Polo," vol. ii., p. 316, we have the further reference to locality and to gold: "Kalar Dewar, Rajah of Ma'bar, had about 1309 A.D., accumulated in gold 1200 millions of dinars" (equal to about 450 millions sterling). Could that treasure have been imported into Malabar? "Probably," says the writer of "Gold in India," in this month's number of the Gentleman's Magazine, already referred to, "had it been known that there were enormous mines in India close to the Malabar coast, between which and Arabia traffic had been carried on from time immemorial, no discussion regarding Ophir would have arisen, but it would have been at once admitted that the gold brought to Solomon came from those mines. We know on authority which cannot be doubted that about 1000 B.C. Solomon received enormous sums in gold, in fleets which went and returned, by the Red Sea, to and from Ophir."

#### THE IRON ORE MINES OF COUNTY ANTRIM—No. I.

The discovery of iron ore in County Antrim does not date much over twenty years. In 1858 not a single ton was raised in the county, whereas in 1878, or 20 years afterwards, upwards of 152,000 tons were raised and exported, thus showing the rapid development made in this industry. For several years after its discovery very little progress was effected; many obstacles had to be overcome; its true and real position, sequence, and correlation were quite unknown; miners experienced in the working of English and Scotch iron ore mines were brought over to prosecute the work here, but only to find themselves in a new field, and surrounded by inexplicable difficulties over which they had neither control nor past experience to guide them. We had no previous history to direct or instruct them—all was a blank, for iron was not supposed to exist in the country; at least any specimens that had been collected were considered more as mineralogical curiosities than aught else, and thus years rolled on, and the millions of millions of tons of iron ore that lay hid in our hills were allowed to remain there because no one had the enterprise to search after them. When we look into the internal resources of England and Scotland we feel convinced that the wealth and prosperity of these countries are mainly due to their mining enterprises, and we cannot but regret that Ireland should so far fall short of that which makes her sister countries so great and powerful.

England owes almost everything to her coals and iron; to these Ireland owes nothing for her prosperity. But has she been weighed in the balance and found wanting? Have her people the same amount of energy which is so characteristic in her neighbours across the Channel? To these questions we are sadly obliged to answer in the negative. Nothing, positively nothing, has been done by her people to realise the amount of mineral wealth that exists in the country, neither do her people exhibit any interest or display the energy required to discover them. This is the failing, and this is what helps to make Ireland what she is. Yet, withal, Ireland possesses much mineral wealth; she is, in the language of the prophet, "A land wherein thou shalt eat bread without scarceness, thou shalt not lack anything in it; a land whose stones are iron, and out of whose hills thou mayest dig brass." The retrospection, therefore, of our iron industry is a simple one, its history is easily told.

During the construction of the Belfast and Northern Counties Railway, in 1847, the attention of Sir Charles Lanyon was attracted by the beauty and diversity of the colours exposed in a cutting at Ballypallady, near Ballyclare. So interested was he in this geological section that he directed the attention of the late Mr. James Macadam, F.G.S., of Belfast, to it, who read a paper to the Geological Society of Dublin, on Jan. 10, 1849, on the subject. In this paper Mr. Macadam describes the deposit as a "kind of ochre," which he got analysed by Prof. Hodges, of Belfast. He mentions the accompanying appearances presented, particularly pointing out the remarkable concretions in the mass having a concentric structure, and also stating that a large mass of trap rock was associated with the deposit, having a concentric structure also, and very interesting. It is evident Mr. Macadam considered the cutting only as an interesting geological curiosity, and not of any industrial value, and nothing farther was done or said about the matter until twelve years afterwards, when Dr. Ritchie, of Belfast, commenced operations on a small scale in what was termed the "paint banks."

Public notice was first made of the locality as an iron ore deposit by a letter which appeared in the Northern Whig, of Belfast, on Feb. 10, 1861, in which the writer vividly explains the various deposits, their lithological characteristics and sequence. Describing the various bands of the ore the writer states, "The nucleus of the ore seems to be in the second cutting on the railway line west of Ballypallady Railway Station, but the iron seams extend far towards the south on a level with the cutting, but dips towards the north. The lower stratum is composed of red and purple clays impregnated with iron, the upper is nodular in its structure. These globules are iron in a state of great purity, and gave on analysis 38 per cent. metallic iron. Valuable specimens of the ore were found in strata half-a-mile nearer to the station, and from its great abundance, and the easy separation of the iron from the ore in the smelting processes, its working would not only be lucrative to the undertakers but would also open up a new and valuable commerce, which would benefit the whole North of Ireland." This letter, from which the above extracts have been made, elicited a reply from Mr. James Macadam, dated Feb. 22, 1861, stating that he had directed attention to this deposit in 1849, the particulars of which have already been given. Shortly after its appearance in the Whig Dr. Ritchie increased his staff of workmen, and commenced working the better qualities of the aluminous iron ore, and continued for several years afterwards the sole representative of the mining industry of iron ores in Antrim. The ore worked by Dr. Ritchie was, however, poor in quality, the analysis rarely exceeding 20 per cent., and was used more as a flux in smelting the richer classes of English hematites, on account of the large percentage of alumina it contained, than for the quantity of metal present in the ore.

It was not until the year 1868 that the era of working the true pisolitic iron ores of the country dawned. The mountains of Glenravel, near Cushendall, on the east coast of the county, were discovered to be teeming with iron—who the discoverer was it may be difficult to determine, but the credit of bringing the mineral to public notice is due to the late Mr. Edward Benn, to whom belonged the royalty, a gentleman of great magnanimity and the pride of his country. Shortly afterwards the district was prospected by the late Mr. James Fisher, of Barrow, resulting in a "tack-note" of the property from Mr. Benn, granting Mr. Fisher the rights to open and mine ores and other minerals at the nominal rent of 10% per annum, who immediately commenced operations.

The ore produced was a fine pisolitic hematite, yielding on an average of from 50 to 55 per cent. of metallic iron, and being almost entirely free from sulphur and phosphorus, was highly esteemed by English ironmasters. It was not to be supposed that such masses of iron ore was exclusive to the Glenravel Mountains, and soon adventurers seemed everywhere on the alert, and prospectors scoured every mountain range in search of the now coveted mineral. Almost simultaneously with Mr. Fisher's undertaking at Glenravel iron ore was discovered, or rather commenced to be worked, at Kilwaughter, near Larne. The credit of the undertaking is due to Mr. Thomas Fisher, who worked the mines successfully for many years, but there seems to be some doubt as to the original discoverer. There is, however, no hesitation in stating that the late Mr. James Stannus, of Carrickfergus, discovered iron ore at Kilwaughter as early as 1852; and after its discovery at Ballypallady, in 1861, he again visited Kilwaughter in March of the same year, and procured many specimens of the ore, which remained labelled in his possession until his death, which occurred about two years ago. He was also the discoverer of iron ore in Island-Magee, near Larne, the mines at present worked by Dr. Ritchie there, and he displayed samples of the ore at Mr. Wilson's—the Ereption—nearly 18 years ago. He was a man of powerful intellect, and a close observer of Nature, but modest and unassuming and retiring in his disposition, "born to blush unseen,"

and it is but due to the memory of this worthy man that this slight tribute should be paid. During the years following the industry progressed rapidly, as iron ore was discovered to exist in almost all our hills, and several extensive companies were formed, prominently the Antrim Iron Ore Company, having Mr. Silas Evans as directing manager; their chief royalties being Rathkenny, Glenarm, Cargan and Broughshane, Ballymena, &c.; the Glenariff Iron Ore and Harbour Company, of Glenariff and Cloghcor, Ballymena; and the Crommelin Iron Ore Company, of Newton Crommelin, Glenravel.

The following, extracted from the "Mineral Statistics for the Year 1878," give full particulars of the number of mines in the county, and the quantity of iron ore raised during that year:—

Name of company.	Name of mine.	Locality.	Character of ore.	Quantities raised—tons.
Portrush Mining Co.	Ballylaggin	Coleraine	Brown hematite	471
Antrim Iron Ore Co.	Broughshane	Ballymena	—	—
Ditto	Cargan	Ditto	Pisolitic	18,200
Ditto	Glenarm	Glenarm	Aluminous	12,500
Ditto	Rathkenny	Ballymena	Ditto	20,000
Glenariff Iron Ore & Harbour Co.	Glenariff	Cushendall	Pisolitic	25,527
Dunloy's Iron Ore Co.	Drumnavaddy	Dunloy's	—	—
Wm. Rodden and Co.	Dunaney	Glarryford	Aluminous	7,350
Knockboy Mining Co.	Eigenay	Broughshane	—	—
Mountcashel Iron Co.	Eivishnabally	Glarryford	Aluminous	9,596
Irish Hill Mining Co.	Irish Hills	Stralld Ballyclare	Bauxite	3,428
Charles Chambers	Eivishnacrow	Glenravel	Brown hematite	—
John Fisher and Co.	Glenravel	Sieve-an-nee	Brown hematite	15,770
W. B. Ritchie	Ballypallady	Ballyclare	Aluminous and	3,693
Ditto	Island Magee	Larne	Lithomarge	—
Knockboy Mining Co.	Knockboy	Ballymena	—	—
Parkmore Iron Ore Co.	Parkmore	Ballymena	—	—
The Larne Iron Co.	Shanes Hill	Larne	—	—
Mining Co.	Agnew's Hill	Larne	—	—
Benjamin Townson	Orbireigh	Portrush	Brown hematite	1,594
Crommelin Iron Ore Co.	Newton-Crommelin	Glenravel	Brown hematite	32,142
Company	melin	Ballymena	—	—
Total				151,359
		Ballycastle blackband		4,375
Gross total				Tons 155,734

Of the above amount 83,327 tons were exported from the ports of Belfast.

#### REPORT FROM CORNWALL.

July 22.—We are just now committed to what is, however, nothing more than is usual at this season of the year—a dull time in the general mining share market. It is not likely, indeed, to last long, for further advances in the prices of metals cannot be very far distant, and they will be the signal for even unusual activity. There are some speculators it is true who are hoping for a reaction, but the general feeling on the part of the holders of shares is to keep them in hand, and beyond that we have very good reasons for knowing that a considerable amount of fresh capital is likely to flow in Cornish mining channels ere long, the result of a growing confidence in the general public in home mining as, after all, a pursuit that affords good opportunities for investment, as well as the means of legitimate speculation.

Attention has been called of late on several occasions to the falling off in the produce of several tin mines, and to the probability that there will be no increase in the quantity of tin raised in the county for some time to come. It is undoubtedly true that the desperate efforts made by our mine managers to keep the concerns above water during the terrible crisis (from which we have only this year fairly emerged) has caused the reserves to be largely drawn upon, and that hence the production has for the mines in operation been brought back again to something like its normal rate, but there is no need why this should be misinterpreted. The production of tin could be very materially enhanced were it desirable by resuming operations in many promising mines that failed to weather the storm, but which now could be wrought again with advantage, and even where the reserves have been most largely treasured upon we have the means of opening up in a very short space of time an enormous area of new tin ground by the aid of the boring machine, and of making production advance at a faster ratio than ever. We do not say that this would be desirable, or that it is at all likely to be done, but the fact is worth mentioning lest there should be an idea current that either Cornwall or its leading mines is in any way exhausted. Our mines are as rich as ever, our lodes as promising; and not only so, but more rich and more promising—as Dolcoath can testify—as they increase in depth. There may be changes of conditions, but the general prospects are unchanged in any way for the worse. These are important facts as bearing upon the immediate future of the tin market, and of the prospects of holders of mining stocks, and should be heartily borne in mind. Whatever may be the case at present, we believe Cornwall is the only tin-producing district in the world from which any largely augmented supply could come for any lengthened period.

Dr. Foster has at length finally severed his connection with the Western District as the Inspector of Metalliferous Mines, and gone to replace Mr. T. F. Evans in North Wales, taking up his residence at Llandudno, and is succeeded by Mr. Frecheville. Dr. Foster's numerous friends in the West (in mining circles and without his name is, indeed, legion) will be glad to know that he does not wholly sever his connection with us, but hopes to pay not unfrequent visits, besides which he will probably act for Mr. Frecheville when that gentleman is on leave. Mr. Frecheville, as a stranger, will have a hearty welcome, for there is no part of Britain in which the old-fashioned feelings of hospitality and greeting are more active than in this far West.

#### REPORT FROM NORTHAMPTONSHIRE.

July 22.—A steady business continues to be done at the works as regards pig, yet the demand even now is not so brisk as it has been, despite the reports from the North of England and other places as to the advance in prices. During the year so far there has been an increase in the production of pig, more particularly at Wellingborough, where the first furnaces in the county were erected by Mr. W. Butlin, of Duston House, and who is nearly the largest producer of ironstone. He is sending a large quantity away by the Midland northwards, a good deal being consumed by the furnaces in Derbyshire. Messrs. Checkland and Fisher, of the Glendon Works, have been working well, and are now the largest makers of pig in Northamptonshire, having five blast furnaces, being an addition of two since 1876. They raise their own stone near at hand, as well as the limestone. At Cransley there has been no falling off in the make at these comparatively new works in the Kettering district. At the other works in the Midland route there has been no change of late, and they have had the advantage of the good trade which has prevailed. The output of pig may be taken at something like 3000 tons a-week. The export of stone into other districts is, of course, much larger than the local consumption, which is not much more than one-fourth of all that is raised. The Midland Railway Company alone now takes close upon 3000 tons of stone weekly from stations and sidings between Wellingborough and Market Harborough for the north. The Stanton Company, who have some seven or eight furnaces on the borders of Nottinghamshire, raise a very heavy tonnage at Wellingborough, Stanton Gate, and at Desborough, near Market Harborough, it is said, equal to upwards of 3000 tons a-week. Butlin and Co. have now several places in addition to their old places at Wellingborough and Irchester, where they raise a vast quantity of stone in open works, sending a large proportion of it into Derbyshire and South Yorkshire. Between Kettering and Thrapstone is also being obtained on a tolerably large scale, not much of which is locally consumed. The town of Northampton may be said to divide the ironstone field into two distinct portions, which may be termed north and south, the stone from one portion going by the Midland and that from the other by the London and North-Western and another line. Blisworth is the place from which the stone raised near to that station, as well as at Gayton, Easton, Neston, &c., is sent, a good deal being forwarded to South Wales. Of the pig a moderate quantity only is taken by the local foundries. However, although the trade in pig, as before stated, is not quite so brisk as

it has been, yet it may be stated to be still in a comparatively healthy state at least, considering that nearly all that is made has to be sent into other districts for plates as well as foundry purposes.

#### REPORT FROM DERBYSHIRE AND YORKSHIRE.

July 22.—At the lead mines in Derbyshire work goes along steadily despite the price of which so much is being said just now. The returns of the quantity of ore raised at the various mines may certainly be said to be satisfactory. Of course at the greater part of them little lead ore has been raised, but at those where there is plenty of capital and the best appliances in the shape of machinery the year 1879 must be looked upon as a good one. Of the 6000 tons of lead ore raised last year no less than 3303 tons came from the Millstrop Mine belonging to Mr. Wass, and situate near to Matlock, and 250 tons from the Baga Mine, belonging to the same gentleman, and which is near the old Roman town of Worksop. The Mill Dam Mining Company at Great Hucklow, Eyam, was credited with 559 tons of ore, and the Eyam Company with 334 tons, so that there was not much to be divided amongst the other numerous mine owners, some of whom have been put down for a few tons, but it may not be out of place to say that the Peak Forest Mining Company, at Chapel-en-le-Frith, raised 100 tons. The assay of ironstone does not appear to interest the Derbyshire smelters in their own county, for they seem to prefer the Northamptonshire stone to any other. There has been a good output of pig of late, and the future is looked upon as favourable now that there has been a rise in the price of every description of pig. But it remains to be seen whether the views entertained by so many will be borne out, or whether the price of raw iron will fall back to what it was a year ago, and which is by no means improbable. In manufactured iron there has been a steady but by no means a brisk business done, and in it there is plenty of room for improvement. The foundries are also comparatively quiet, although there are two or three rather favourably off. The house coal trade continues quiet, and at many places the men are not working more than half time. To London a fair tonnage is being forwarded from Clay Cross and other places, but the prices are still unremuneratively low, so that profits are not now taken into consideration. Steam coal is in fair request, and of late an increased tonnage has been consumed by the railway companies, whilst a good deal is also being absorbed by the blast furnaces. As regards other descriptions of coal there has been no change. A considerable quantity of coke is being produced, which appears to go off well.

In Sheffield business is much quieter than it has been for some time, and the men are not fully employed. The mills are not running so well as they did, whilst there has been a falling off in the demand for the raw material. The make of pig has kept up well, but there are still considerable stocks on hand. The advance in the price has not led consumers to purchase for forward delivery, and they are content to buy for their immediate wants. A large order for steel rails has been given out by the Great Northern Railway Company, some part of which, it is understood, has been taken by the Phoenix Company, whose works are near to Rotherham. There has, however, been a considerable decline recently in the price of steel rails, and it is said that orders have been taken as low as 67 per ton, and in some instances even lower. There has been a gradual decline in the business doing in cast-steel, but a better state of things is now anticipated, seeing that a good deal is being used for structural purposes. America continues to take a large quantity of steel from us, as well as of the better qualities of table and other cutlery. A few of the leading houses engaged in cutlery are fairly off for business, but the smaller ones are anything but well off, as inferior goods are not in much request just now for either home or foreign markets. Spring and Bessemer steel tyres and axles are in fair request, but the activity recently prevailing in the file trade has fallen, and there is some probability that a portion of the late advance in wages will be taken off. In hoops and telegraph wire there has been a steady demand, so that the mills have been running well. Not so much is being done in ship and boiler plates, and the same may be said with respect to steel rods. Some of the foundries are fairly off for work, but others are quiet, comparatively few orders as yet having come in for builders' castings, for which there should now be a brisk demand.

The South Yorkshire coal trade is particularly dull as regards household qualities, and the prices are such that business is not worth doing. Steam coal, however, sells more freely, this being the busy season for shipping from Grimsby to the North of Europe, and Russia has given a large order to the district. The men at the Barrow Hematite Colliery have had notice to leave, which is likely to terminate in a reduction. The miners at the Silkstone Main it is understood have also had notice, but will continue at work, so that no doubt an arrangement will be come to, and work go on as usual.

The report of Messrs. Davy Brothers and Co. (Limited) shows that during the year a profit of 43277 was made, nearly equal to that of the previous year. The dividend is to be 15s. per share, as compared with 12s. 6d. per last year.

#### TRADE OF THE TYNE AND WEAR.

July 21.—The Coal Trade, on the whole, shows a little improvement. Best steam coal is in fair demand, and there is a slightly better demand for second-class, and also for gas coal. The demand for small coal is also stronger, caused by the improvement in the general manufacturing trade of the district. The shipments of coal and coke at Tyne Dock have been above the average. The demand for coke has improved a little, and a slight rise in prices has taken place, consequent on the improvement in the iron trade. There is little improvement in the house coal trade; indeed, this branch of trade is in a worse position than any other, and unless the output is reduced little improvement can be expected until the approach of winter.

For the first half of 1880 the production of pig-iron in the Cleveland and Durham district has been higher than in any previous period in the history of the trade. Of iron from native and imported ores the average production for each of the six months has been 198,087 tons, while in the year of most intense demand the average output did not exceed 162,000 tons monthly. In part, however, the increased output is due to the large quantity of foreign ores now smelted in the north-eastern district—about 40,000 tons of hematite iron and spiegelisen having been monthly produced—for the steel manufacturers chiefly. The exceedingly large output at the present time is taxing the resources of the older mines in the Cleveland district, and with the contemplated putting of more blast furnaces into operation it is probable that additional mines will be opened out in the eastern and inland portions of the mining district.

The Northumberland miners annual holiday was observed on Saturday near Blyth, when about 12,000 men were present. The report of the secretary shows that the district Union is in a prosperous condition, and the number of members has increased during the past year. Speeches were delivered by the president (Mr. Bryson), Mr. Dixon, Mr. Burt, M.P., and others. Mr. Bryson does not approve of the proposed Employers' Liability for Accidents Bill. He seems to fear that the Bill may induce the masters to withdraw the payments they now make in the shape of "smart money" and their contributions to the Miners' Permanent Relief Fund. Mr. Burt holds a different opinion, and he does not think the Bill will affect that district to any great extent. He holds the opinion that damages for accidents will not often be sued for, and that this will only be done when gross culpable negligence is proved on the part of the owner or agent. There appears to be only one bone of contention between the masters and men in this district at present—that is, the question of house rent. The bulk of the men are provided with houses, but those who cannot get houses have to rent them, and they are not allowed the payment for them. This is certainly an anomaly, and scarcely appears to be fair. An attempt to get this grievance adjusted is to be made.

There has been much thunder and lightning in this district lately, and we have an account of the descent of lightning into a coal mine in Durham on the 13th inst. On this day, about 2:30 P.M., the electric fluid descended the Willy Pit, Tanfield Moor Collieries, and

## Meetings of Public Companies.

## AUSTRALIAN MINING COMPANY.

The report of the directors prepared for presentation at the meeting on Monday states that the colonial agent has received 23677. 0s. 10d. for rents, and there are 5812. 12s. arrears outstanding.

As to the special survey of 20,000 acres at Tungkillio, Mr. Davenport states that there is a marked improvement in the general appearance of the farms, in the fencing, and in the better cultivation of hitherto neglected corners. Palmer township has, however, improved less than was expected, the new line of railway to Morgan having diverted from Palmer much of the traffic to and from the River Murray; on the other hand, this railway is causing the scrubby district along the river to become more occupied; there are now some good sized farms under cultivation, and the increase of population will be long beneficially influence the Palmer township.

The olive plantation, 20 acres, suffered much by the severe drought of 1878, which nearly destroyed the olive trees which had been planted in the early part of that year as an experiment, but the destruction proved ultimately not quite so great as was feared, 163 trees having survived out of about 1500. These 163 trees were all thriving when Mr. Davenport last wrote, May 28, and he says that young trees in succession to those died off were being removed from the nursery, and placed in the ground with all possible care.

Charlton (634 acres) has been re-leased for seven years at the same low rent on condition of it being enclosed with sheep proof fence. This has been done, and Mr. Davenport reports that the pasturage is improved, and the ultimate value of the property increased.

As to the Port Augusta water frontage (1½ acre), it is stated that in the governor's opening speech to the Legislative Assembly, May 27 last, it is announced that the great and increasing importance of Port Augusta renders it imperative necessary that some comprehensive scheme should be at once undertaken for providing additional facilities for the loading and discharge of large vessels, and that negotiations have been entered into with the owners of the wharf frontage, with the view of carrying out the work. There is no doubt that the company's allotment, from its position and deep water frontage, is likely to become a valuable property—it continues let at 2½ a month.

The company have an available balance of 23947. 9s. 4d. (exclusive of 5552. 15s. unclaimed dividends), out of which the directors propose to pay on Saturday next a dividend of 2s. per share.

## NEW GOLD RUN COMPANY.

The statutory meeting of shareholders was held at the offices of the company, Finch-lane, on Wednesday,

Mr. J. LORD in the chair.

The notice calling the meeting was read by Mr. T. E. BRIGGS, the secretary.

The CHAIRMAN said this was the statutory meeting, at which no accounts would be presented, and at which there was, in fact, very little to communicate to the shareholders. As far as they had gone in the reorganisation he thought he might say that they had been eminently successful. Up to to-day the number of ordinary shares taken up in the new company was 25,559, and there was no reason to doubt that in the next month or six weeks they would secure the adhesion of more shareholders to the new scheme. The number of preference shares issued was 18,863, and he was happy to say that many creditors of the old company in California had agreed to take preference shares for the claim they had against the old concern to the extent of about 3025 shares. The board thought this was very successful—more successful, indeed, than they had anticipated at one time. Their new superintendent had gone on with the work very quickly indeed. They had expected that the mill would be at work by the 1st of September, but at the same time in a letter they had received only a few days ago the superintendent said he hoped to improve upon the time, so it was probable it would be at work before the time named. At the present moment they were running upon the top dirt. They had yet to find whether they would be able to mine, but they hoped to make a small one. The water was turned on on June 28, so that now they had been running for three weeks, and in another week from this date they would probably know the result. During the past four months they had not been idle, but had proceeded with the utmost dispatch to get things in order. As regarded the new superintendent they took him because he had a first-class character from his former employers. There were no dark clouds before them; there might be a little difficulty more or less with the creditors of the old company, but if they did not choose to take the company's terms they would go nowhere. The directors felt it was a very good thing to have shareholders out in the district, for that was to a certain extent a security to them. The creditors in England had come in, and nearly the whole of the debenture holders, therefore he thought they might congratulate themselves that they had done extremely well. In another month or six weeks they would be able to decide whether they could wash the top dirt successfully. In about two months they would be able to tell what profit the mill would make. If the mill worked well they had gold enough to last for many years. The title was secure, and he believed by this time duly recorded.

The CHAIRMAN, in reply to questions, said he expected they would be able to get the mill to work, but he was not sure. He was not sure of the extent of the security to them. The creditors in England had come in, and nearly the whole of the debenture holders, therefore he thought they might congratulate themselves that they had done extremely well. In another month or six weeks they would be able to decide whether they could wash the top dirt successfully. In about two months they would be able to tell what profit the mill would make. If the mill worked well they had gold enough to last for many years. The title was secure, and he believed by this time duly recorded.

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On the motion of Mr. RICHARDSON, seconded by Mr. PENNINGTON, a vote of thanks was passed to the directors, and the meeting broke up.

## WEST KITTY MINING COMPANY.

The four-monthly meeting of shareholders was held at the Cannon-street Hotel, on Tuesday,

Mr. J. B. REYNOLDS filled the chair, on the motion of Mr. F. W. MICHELL, seconded by Mr. Alderman BOWMAN, of Southampton.

Mr. F. J. HARVEY (secretary) read the notice calling the meeting.

The CHAIRMAN said:—Gentlemen,—If by taking the chair at your request I can in any way facilitate the business which is coming before us I shall be pleased. When last we had the gratification of meeting we assembled on the mine, in order that shareholders might, if they pleased, examine the whole of the property for themselves, and gather such information as they might like to have concerning their investment. From the result of that meeting I hope the object we had in view was, at any rate to a great extent, realised, and that not only the shareholders who assembled benefited, but that those who could not attend the mine were all the better informed because of the visit of those who did. But the committee thought they rightly interpreted your wishes by convening this meeting in London, even if as a consequence they have to convene the next on the property, which is an event not improbable. You are aware that at the last meeting our excellent manager was able to report an improvement in the 72nd end, and that we were just entering the tin ground, the like of which has made such large profits in the mines immediately adjacent—especially Wheal Kitty. You are also aware that the rock from which these riches are taken is very hard, and, seeing that we have had during the last four months to excavate this hard rock, not so much with a view to getting mineral as with view to obtaining ventilation, you will agree with me that the work has been very hard, and justifies the amount our manager estimated we should get, thanks to the continuance of good fruits from the 72nd end and other points. But those acquainted with mining will understand that we have left more tin behind us than we have taken away, as no stoping operations have been effected. If Capt. Vivian can make as good progress in the next four months as he has done in the past four months we shall have a much better state of things at our next meeting than even we have to-day, and concerning the probability of it or otherwise Capt. Vivian will inform you, and I think you will find that he as well as others who know the property thoroughly are not only of opinion that our progress will be highly satisfactory, but that the more we see of this undertaking the more certain we are that you are working one of the most valuable properties in the county of Cornwall. That, gentlemen, is the unanimous opinion of those whose opinion is worth anything at all. The balance-sheet which has been read to you speaks for itself. I do not know that under the circumstances anything could be possibly more satisfactory. The arrangements which the manager was empowered to carry out with regard to greater facilities for stamping the ores have been successfully effected at a less cost than was anticipated, on account of which only 30s. has been called for. We find that the plan of having every amount which comes to the company's exchequer paid direct to the bankers of the company is a system which greatly facilitates the keeping of the books, and which gives universal satisfaction to the proprietors. We also find that the no-credit system which we adopt gives confidence to those who wish to avoid liabilities, and that by strictly carrying out to the letter the Statutes Act of 1869 we ensure the regular and successful working of your affairs. At our last meeting I informed you that negotiations were nearly completed for obtaining further additional ground adjoining Wheal Kitty, and at that time we possessed the extent of ground adjoining Wheal Kitty as shown on the plan; but, in addition to that, and altogether independent of it, your committee after much exertion, not to say anxiety, have secured a still further extension of ground on a line adjoining Wheal Kitty, which it is estimated adds thousands of pounds to our mine. I should say, by way of explanation here, that this ground was promised to the New St. Agnes Mine (now West Kitty) some five years since; but, owing to exceptional circumstances a conveyance of it has not been obtained. We still held the proprietors of such ground, however, to their promise, notwithstanding its large augmentation in value, in consequence of the richness of Wheal Kitty levels, which are extended right up to it, and to our satisfaction as well as to the credit of the proprietors we have succeeded in getting possession of such mineral rights (leases and all inclusive) for the nominal sum of 250s. As these were delicate negotiations the committee took upon themselves individual responsibility by obtaining such ground, paying for it and having it conveyed, knowing that the company would only be too glad to repay them the amount so advanced. Soon after they had secured the ground and paid the deposit they were offered 5000l. If they would cancel the bargain, and the value of the ground can be more accurately understood when it is known, as it is, that the Wheal Kitty side, from their points of operation alone, 12 tons of tin per month could be excavated from

it. It will be our duty to push back the West Kitty works into this ground, and to other of like value with all possible dispatch, as we are now doing. Working in the other direction it is noteworthy that the 72nd end west going towards New Kitty has greatly improved in appearance, and it is considered that a valuable mine in that direction is also a certainty. You will excuse, gentlemen, the length of these remarks. The committee feel very deeply the responsibility of conducting such important business as comes before them in connection with this company. The business at present is small; but it is leading up to one of very considerable extent, and our endeavour will be to pay dividends as quickly as ever we can consistently with the proper development of the undertaking. (Hear, hear.) I will not detain you with my thoughts concerning a very important question which was raised at the last meeting relative to boring machinery. I presume Mr. Michell and Capt. Vivian are able to give us their views on this subject; but it always wise, especially in enterprise of this kind, to proceed with caution, and to take no step which hereafter you can by any possibility have cause to regret. Whatever our decisions are on this or any other matter connected with the company's affairs I wish them to be unanimous. I have carefully estimated, together with the agent, the cost of the ensuing four months. If no additional expense is voted at this meeting, and supposing we employ as large number of hands underground as we can, and in order that we may buy and have made over to us as a company the additional ground which has been secured, and also that we may make our financial position thoroughly good, I think that we should be wise in making a call of about 3s. per share. I move the adoption of the balance-sheet.—Mr. COOK seconded the resolution, which was put and carried without any discussion.

The SECRETARY then read the minutes of the previous meeting, which were confirmed, on the motion of Mr. F. W. MICHELL, seconded by Mr. Alderman BOWMAN.

The CHAIRMAN then read the following report from Capt. Vivian:—  
July 19.—Since the last meeting, held on March 18, we have holed a winze from the 60 to the 72; this has ventilated the 72. Our work can now be carried on much faster than it has been in the past four months. In the 72 driving east the lode is 2 ft. wide, worth about 7l. per fathom for tin. In the 72 driving west the lode is 3 ft. wide, producing a little tin; the appearance of the lode has very much improved in the last 6 ft. driven. I now purpose to put up a rise from the 72 to the 80; we have a lode worth 10l. per fathom where I purpose to rise. This will ventilate the 80, and open up a good piece of tin ground for stoping. In the 60 driving east the lode is 3 ft. wide, very kindly in appearance, producing a little tin, but not to value at present; the 72 was also of no value under this point. We have about 8 fms. more to drive to get over the tin ground, where I purpose to put up the rise. In the 84 rise, in the back of this level, the lode is 2 ft. wide, worth 6l. per fathom for tin. We have about 5 fms. more to put this rise through to the 72; this will ventilate the 84, and open some good tin ground for stoping. It can be seen from our section that there is a cross-cut driven 15 fms. south at the 84; it was suspended on account of our ground being very limited in that direction. In the past four months we have had some additional ground added, which is considered to be valuable. I now purpose to drive the cross-cut again, as it is well known to practical miners that cross-cutting is the life and soul of mining. I think you will all see from my report that we are opening up a valuable property.—WILLIAM VIVIAN.

Mr. F. W. MICHELL, referring to Capt. Vivian's expression in his report, that cross-cutting was the life and soul of mining, said the discovery of tin at Wheal Peavor was entirely through cross-cutting. At that mine they were working the one lode, which was not so satisfactory as could be wished, and they cross-cutted some distance in many fathoms which produced good tin, which led them on to further discoveries, for which they were getting into something good there, as a rule, at Wheal Peavor they kept three cross-cuts going, and had three at the present moment, and as soon as one object was accomplished another was commenced.

Mr. ALEXANDER said he thought Capt. Vivian should explain the position of the mine as compared with four months ago. At the time of the last meeting they had come upon a bunch of tin in the 72 fm. level east, and had found it productive to the extent of about 18l. per fathom, but it fell off in other parts to about 10l. per fathom. This would look rather discouraging at first, and therefor it would be satisfactory to the shareholders if Captain Vivian, in whom the shareholders had every confidence, would give the reason of the falling off.

Capt. VIVIAN, after referring to the fact that at the last meeting Capt. White, of Wheal Peavor, made a report on the mine which was of a very satisfactory character, went on to explain that tin was not in a regular bed like seams of coal. Copper, tin, and lead were bunched, which of course would account for the lode being more productive at one time than another. As a practical man he did not feel in the least discouraged by the temporary falling off which Mr. Alexander had alluded to.

Mr. F. W. MICHELL, in confirmation of Capt. Vivian's explanation, said that in Wheal Peavor they had a length of tin ground of 100 fms., which varied in value from 5l. per fathom to 100l. per fathom. Therefore in West Kitty the value per fathom might be up to 18l. at one time, down to 10l. another, and up again to 80l. or more another.

Mr. ALEXANDER said it was well known that the mine was expected to be productive driving east, in the direction of Wheal Kitty, but he thought the shareholders generally would be pleased to hear from Capt. Vivian what was expected from driving west.

Capt. VIVIAN said that in the first two months of the last four months they had not done much in driving west. They had not ventilation enough to drive both east and west, and, therefore, the western end was suspended. Now they had holed the winze they could put on any number of men required. Till recently there had been but a poor lode driving west, but for the last few feet in driving they had got into a large muddle lode, the same as they had driving east, and there was reason to believe—and Captain Joseph Vivian, who was connected with the mine some time back, always stated—there was a great deposit of mineral under the Beacon Hill. The lode to the west was certainly changing, and he believed they were getting into something good there. They always looked for parallel lodes to be productive in Cornwall.

Mr. MICHELL said there had been two powerful lodes in Wheal Kitty, both rich. The old men worked out one lode, and thought they had worked the mine out, but the new company worked deeper, and cross-cut another lode, which was the lode which sustained Wheal Kitty 25 years, and from which I, made its dividends.

The CHAIRMAN said that in Capt. Vivian they had a manager who had been well tested and tried. He was glad that Mr. Alexander took the opportunity of expressing his opinion with respect to the confidence which the committee had in Capt. Vivian. That confidence had been the result of many years hard work under many of the gentlemen connected with this company. The principal feature in the proceedings of to-day would have reference to the new ground which had been obtained by the committee, and he thought that in the not distant future the shareholders would find he was correct in the favourable opinion he had formed respecting the new ground. The committee paid for the additional ground, which was some 200l., and taking into account the cost of lease, lawyer's charges, and so on, he calculated it would cost the company altogether the sum of 2000l. but the committee paid the difference, and the shareholders were offered 500l. to cancel the engagement, and seeing that to-day they could get 1000l. for the additional ground if they chose to take it, he thought at any rate the shareholders might congratulate themselves that they could, if they chose, instead of making an extra shilling a share call, realise this additional ground and put the surplus in their pockets. That, at all events, was one practical result of the past four months' working.

Mr. MICHELL said the additional piece of ground which had been obtained by the committee and paid for by them had been handed over to the company for the same price which they had paid for it.

Capt. Vivian's report was then adopted.

Mr. MICHELL moved a resolution to the effect that the shareholders viewed with the liveliest satisfaction the success which had attended the efforts of the committee with respect to securing the additional ground above referred to, and record their thanks to the committee for the steps they had taken in the matter. He moved that as a matter of form.—Capt. VIVIAN seconded the resolution, which was put and carried.

Mr. G. BUDD, in acknowledging the vote on the part of the committee, said he related to the resolution the qualification that it was a mere matter of form, as Mr. Michell had remarked. (A laugh.) The committee spent a great deal of time in investigating every item connected with the company, and some of the members came a long distance to attend the committee meetings, and never received a farthing for their expenditure of time and labour. He referred to the care and ability which had been displayed by Capt. Vivian, and he fully endorsed all that had been said with regard to the ability and straightforwardness of Capt. Vivian. They had a very able chairman—a gentleman who was largely conversant with mining operations, and as far as he could judge no chairman had interested a company more than Mr. Michell. He certainly must say that his confidence was even greater in the Chairman than in the mine. Personally he (the speaker) knew nothing about mining, but he was quite content to be guided by the judgment of the Chairman, and he believed that sooner or later they would receive a handsome return upon their investment in this company. He believed that the prospects of the mine were brighter than ever they were before. (Hear, hear.)

Mr. MICHELL said he wished to explain that when he talked about the resolution being a mere matter of form, what he meant was that it must be brought forward in a formal manner, but he certainly did not mean that it was a formal resolution in the sense that Mr. Budd seemed to have understood it. He fully agreed with Mr. Budd that the committee had taken the liveliest interest in the matter.

Mr. Budd said he hoped it would be understood that the committee did not charge the company a penny more for the additional property than they paid for it.

The CHAIRMAN said that the committee were simply acting as the company's agents, and agents could not make profits out of their employers. He might mention that it was usual to make an assignment of such property to the secretary on behalf of the company, but as this was a very important transaction he thought it would be advisable to associate two other gentlemen with the secretary in the assignment. There would be no liability on the part of the persons to whom the property was assigned, as the property would be covered by the company itself.

After a short conversation a resolution was passed to the effect that the assignment be made on the part of the company to the secretary, Mr. Budd, and Mr. Alderman BOWMAN.

The CHAIRMAN said the next business was the question of ways and means. The committee had gone carefully into the question, and were of opinion that it would be advisable to make a call of 3s. per share. Some of the shareholders were anxious that the company should not get into debt, but that it should pay its way and work the mine as efficiently as it could be worked; and if that course were departed from he felt that the committee would lose the confidence of some of their best supporters. The committee had the comfort of knowing that if a call were made it would be paid. (Hear, hear.) As a proof he might mention that out of the last call, which was calculated to produce 6000l., only 2l. 10s. remained unpaid, and there was no reason to doubt that this would be paid. He moved that a call of 3s. per share be made, payable to the bankers, Messrs. Williams, Williams, and Gylls, Truro, on Saturday, Aug. 7.

Mr. Alderman BOWMAN seconded the resolution, which was put and carried unanimously.

The CHAIRMAN said the next business was to consider the desirability, or otherwise of introducing boring machinery into the mine. He was sorry that Mr. Dutton, who had interested himself deeply in this matter, was not present. He might mention that Mr. Dutton's opinion was unchanged regarding the desirability of introducing boring machinery into the mine, and one or two other shareholders were of the same opinion. At the same time he must say that he

struck a young man who was at the bottom of the shaft in the arm, partially disabling him for a time, and discolouring his arm from wrist to elbow. The lightning in striking the iron sheets at the bottom of the shaft was divided into two currents, one going south and one north, following, no doubt, the rails. The south current travelled along an engine plane a distance of 1000 yards, and exhausted itself in ropes, sheaves, &c., and finally in a large sheave at the end of the plane. The north current went up an incline plane a distance of about 900 yards, and made its exit at a day drift. We recollect that some years ago an explosion occurred in an old pit on the north side of the Tyne during a thunderstorm, and it was supposed that the gas which had accumulated in the shaft had been ignited by the descent of lightning.

The return of the accountants appointed under the sliding scale for the coal trade in Cumberland for three months ending June has been published. The average price got for coal was a little over 5s. 0½d. per ton for the quarter. This is about 2½d. per ton less than the previous quarter, and miners' wages will be reduced 2½ per cent. on this rate. It is expected that the men will accept this award—that is the members of the Miners' District Union, and also those who are outside the Union.

The Central Board of the Miners' National Union, representing 250,000 miners, has presented a memorial to the Prime Minister protesting against an insurance clause being incorporated with the Miners' and the Employers' Liability Bill. They state that they consider it to be unjust to insure against accidents arising from negligence on the part of owners and agents, and also that money compensation is not the motive of the men in pressing forward the measure, but rather increased safety in working. They object to any insurance clause being mixed up with the Bill, either compulsory or permissive. The memorial is signed by B. Pickard, V. P.; E. Cowey, W. Pickard, N. Wilkinson, J. Wilson, T. Joyn, J. Ninon, treasurer; Mr. Crawford, secretary.

## REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

July 22.—The market this week wears an aspect of sustained if not, indeed, of developed improvement. Minerals participate in the general brighter aspect of things. For coal some proprietors ask an advance of 6d. per ton on forge qualities, notwithstanding that the market is over supplied. Good qualities thus become an average of 7s. to 7s. 6d. per ton, but inferior descriptions may be had at as low as 6s. Consumers of coke are rather more desirous to place contracts, and medium Derbyshire sorts are firmly held at 16s. per ton. Ironstone is scarce, and vendors are strong, certain of them asking a rise of 6d. to even 1s. per ton. Northampton qualities may be had at about 6s. 6d., delivered into this district.

Pig-iron in Wolverhampton yesterday and in Birmingham this afternoon presented a healthy appearance in respect of all the descriptions offered. There was more negotiation between consumers and makers and agents, and actual sales, too, were on a larger scale. Prices were strong at a rise of from 2s. 6d. to 5s. per ton. Staffordshire all-mine pigs were 37. 15s. for hot-blast qualities. Hematites are selling more freely, and agents acting under instructions from their principals were asking a rise of 6s. Blaenavon hematites were active at 37. 10s. per ton. Finished ironmakers reported that orders were less difficult to secure, and that the American enquiries direct and through merchants were encouraging for the early future.

In Wolverhampton on Wednesday a quarterly meeting was held of the South Staffordshire and East Worcestershire Mining Accident Fund. The money available for distribution was double the amount required. After the widows of several colliers, who had met with their death while following their occupation, had been voted 47. each, and each orphan an additional 10s., there remained a considerable sum to be carried forward to the credit of next quarter. One of the workmen's representatives announced that the accounts of the relief fund raised for the Black Lake Colliery accident in 1871 had now been wound up. There was a balance in hand of about 187., and of this 87. had been voted to the Mining Accident Fund, and the remainder to the West Bromwich Hospital.

The Railway Rolling Stock Company (Wolverhampton) half-yearly report sets forth that although for a short time business seemed to exhibit every symptom of improvement, the revival suddenly collapsed, and low prices and depression again prevailed. The profits of the half-year are 36787., which enable the directors to recommend the usual dividend on the preference shares, and at the rate of 3 per cent. per annum on the ordinary shares, leaving a balance of 687. to be placed to reserve—425 wagons have been bought and 70 sold during the half-year, leaving 4644 in the possession of the company.

## REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

July 22.—The report of the Inspector of Mines for this district (Mr. Hall) for 1879, which has been issued lately, contains much valuable information, and it would be well if all connected with coal mining would study it carefully. It is extremely unpleasant to learn from this report that the number of fatal accidents is larger in this district, for the amount of coal raised, than anywhere in the United Kingdom, with the exception of Monmouthshire. The district is far from being one of the most dangerous, and but few of the mines give off any amount of fire-damp. The accidents are made up for the most part not by great explosions, but by occurring frequently over the whole district to single individuals, amounting altogether to a serious and partly preventable loss of life. The inspector remarks that this is greatly due to the managers neglecting to enforce the special rules which enable them to enforce compliance with their reasonable orders, and he also adds that he has taken proceedings in several instances and has obtained convictions for neglect on the part of the managers. It seems also that the quantity of mineral raised per each person is less in North Wales than elsewhere. Thus we have in North Wales 226 tons per year for each person employed, but in West Lancashire the amount equals 326 tons per person. The report should be invaluable in the hands of an intelligent colliery manager, for not only does it record the number of the accidents but it points out their causes also.

The letter signed "A. U. R." on "Gold in Wales," which appeared in the Supplement for July 3, is attracting considerable notice in the district; most of the local papers have copied or taken extracts from it. There is of course no doubt but that there is some gold in Wales, but, to quote from an authority on the subject, "it remains to be seen whether, with strict economy and with the use of the most approved appliances for mining and dressing the ores, these North Wales gold mines can yet be made to pay."

The Coal Trade still continues dull, but there are a few signs of revival in this district. Last week we noticed an advertisement in a local paper for 50 colliers for the Brynkinalt Collieries, and the trucks of the Presgwyn Collieries are now in motion again upon the railway after a long rest.

"Observer" in last week's Journal mentions the discovery of some lead at the new Crickheath Mine. This will indeed be good news for the proprietors, and it is to be hoped that success will finally crown their labour. A discovery of lead has also taken place at the Queen of the Mountain Mine, Halkin Mountain, and some was sold lately for 87. 15s. per ton. Here again the perseverance of the owners richly deserves to be rewarded. On the whole it may be stated that mining prospects are becoming somewhat brighter, and not only so at the mines themselves but a more enterprising spirit is apparent amongst those who form the all-important foundation for mining matters—viz., the people who become the shareholders.

CHEMICALS, MINERALS, AND METALS.—Messrs. J. Berger Spence and Co. (July 17).—Alumina: Loose Lump, 67. 10s.; ground, 77. 5s.—Arsenic: Best white powdered, 102. 15s.; Bleaching Powder, 57. 7½d.—Borax: Refined English, 60l.—Coppers: Green, 47s. 6d.—Copper: Sulphate, 217. 10s.—Nitrate of Lead, 297. 10s.—Soda: Soda, 15s.—Potash: 10½d.—Soda: Cream Caustic, 87. 15s.—Sulphate of Zinc, 137. 10s.—Sulphur: Roll, 97. 10s.; flour, 107. 15s.—Tin crystals, 63½d. per lb.—White lead, 217. 5s.—Brimstone: Best thirds, 57. 15s.—China-Clay, 39s. per Ochre, 57. 15s.—Oxide of Zinc, 257. 10s.—Talc, 57. 15s.—Umbre, 50s.—Copper: Best ingot, 66s.; second ingot, 66s.—Lead: Best soft English, 157. 10s.—Pig-Iron, 49s. 4d.—Spelter, 197.—Tin: British common block, 977.—Naphtha, Miscible, 49s. 4d.

thought those gentlemen had not the same full information which he himself had, and ought to have; and at the same time he should mention that those gentlemen advocated the introduction of mining machinery provided the committee approved of it. He believed that if they were present they would agree that a postponement of the question would be desirable. Capt. Vivian and Mr. Mitchell had done what they were asked to do at the last meeting—namely, they had made every possible inquiry and had satisfied themselves that the introduction of boring machinery would not be advisable at present. He would ask Capt. Vivian to state the conclusion he had come to on the subject.

Capt. Vivian said that since the last meeting he had made every enquiry, and had satisfied himself that although the ground could not doubt be won though much quicker yet the cost would be very much more. The introduction of boring machinery would cost between 600l. and 700l., and the monthly cost would be 40l. or 50l. more. Moreover it had scarcely yet been decided which was the best boring machine. Looking at all the circumstances, he thought the question had better be postponed for another four months.

Mr. MICHELL said he fully endorsed all that Capt. Vivian had said. When they were sufficiently advanced to say which point should be pushed forward he should be in favour of the introduction of boring machinery, but at present they were not sufficiently advanced.

The CHAIRMAN said he fully agreed that at present it would be premature to introduce boring machinery.

After some further conversation a resolution was passed to the effect that it is expedient to gain further information as to the advisability of working boring machinery, seeing that it has not yet been adopted in the St. Agnes district, and that the whole subject be resumed at the next meeting of shareholders.

A cordial vote of thanks was then passed to the committee, and a special acknowledgment was accorded to the Chairman for his attention to the business of the company and his able and courteous conduct in the chair.

The meeting then broke up.

#### GROGWINION LEAD MINING COMPANY.

The half-yearly ordinary general meeting of shareholders was held at the offices of the company, Change Alley, on Wednesday, Mr. G. ROSS in the chair.

Mr. GEORGE BEDFORD (the secretary) read the notice calling the meeting.

The CHAIRMAN said that the sum and substance of what he had to say was contained in the first paragraph of the report. It would be seen there that they had once more turned their backs upon the late very dull times, and were again in a position to welcome a moderate dividend. He called it a "moderate dividend" because it was less than the directors expected to declare when he addressed them in January last. They then had experienced about two months of prosperous prices after the three or four dull years, and, therefore it was when he last met them that he expressed his hope that in the coming six months if ore kept its price the profit would be very considerably added to, if not doubled. As it was the profit for the half-year just closed only exceeded the previous one by 200l.; but it might be as well to let the shareholders know that they had continued to realise the price which they got when he last addressed them they would have earned sufficient to pay 25 per cent. per annum.

Of course they were liable to fluctuations. In May last the price was as low as 9/11s. 11d., and it had now risen to 9/11s. 6d. per ton. The accounts were stated in the usual form, and the revenue accounts contained the expenditure for seven months, as against returns for six months, which explained why the labour cost, salaries, and so on, were higher than in the preceding six months. The next point was the report made by Mr. Kitto, who was not here to-day as he had really nothing to add to the report except to assure the shareholders that he held the same high opinion of the mine which he had always entertained, and was perfectly satisfied that the property would yield profits for a very long time to come. In the report the directors stated that the time had now arrived when they proposed opening the mine below the deep adit. He had on previous occasions told them of the discoveries which had been made below the deep adit, which had been the rallying point of the operations, far exceeding anything they had had above. But rich and profitable as had been the ground above the deep adit, there was not the slightest doubt that below the bed of the river they would find far richer deposits than had been found in the upper levels. The average value per fathom of ground in the upper levels had been 15 cwt. per fathom; there was not a single fathom below the adit level which had not averaged about 25 cwt. per fathom, or more than 50 per cent. in excess of the value of the ground above. Provided they had a limited amount of time of the value of the ground above. Provided they had a limited amount of time to develop that lower ground he thought from that source alone, apart from the development of the ground above, particularly in the eastern portion, he thought they might expect to realise considerable profits. In estimating the profits they must always bear in mind that they must have a fairly average price for the ores, and looking at the past history of metals and the fluctuations which had gone on in them, he could not see any reason to doubt the period of dull times in metals was to a great extent over, and that more prosperous times were dawning for shareholders in mines. With respect to the accounts, he had nothing further to say except to add that it was the intention of the directors at the annual meeting which would be held in six months to propose a resolution which would do away with the necessity for half-yearly meetings, but the directors did not propose to do away with the custom of making up the accounts half-yearly and proposing interim dividends. In conclusion the directors proposed that the report of the directors and managers' report and statement of accounts be received and adopted. Mr. W. BROOKES seconded the resolution.

After a short discussion, in the course of which the CHAIRMAN stated that the utmost economy was required by the board, the resolution was put to the meeting and carried unanimously.

The CHAIRMAN said it was with great regret he had to announce that Mr. J. Killingham, the auditor, had died since he audited the accounts, and he was sure all the shareholders would regret having lost the services of that gentleman. At the next meeting the shareholders would be called upon to fill his place.

The meeting then broke up.

It may be mentioned that, apart from those present, 2508 shares were represented by proxy.

#### THE MINING COMPANY OF IRELAND.

The half-yearly meeting of this company, to consider the report which has already appeared in our columns, has been held at the company's offices in Dublin under the presidency of Sir ROBERT KANE, Bt., LL.D.

The SECRETARY (Mr. Wm. Harold) read the report.

The CHAIRMAN in moving that the report and abstract of accounts be received and entered on the minutes, said the proprietors would have seen from the report and accounts as circulated the serious disadvantages under which the operations for the past half-year had been carried on, giving a total loss on transactions amounting to 3569l. That did not merely sweep away the credit balance with which they commenced the period, but it left them with a net loss of 2792l. That they might consider had been altogether unexpected, being almost exclusively due to the great depression in the value of lead, and, of course, lead ore, and the other preparations of lead in which they dealt. They valued the stock of lead at the close of the last half-year at the rate of 17l. per ton, and on the day of the meeting he was able to tell them that that was an exceptionally low valuation, and that day lead stood at 19l., having risen between the day of the valuation and the day of the meeting to that figure. However, that did not last; the price of lead began to fall almost immediately afterwards, and at the close of the half-year now dealt with they were obliged to take the value at the unprecedentedly low figure of 14l. 10s. per ton, which on the total stock of lead—1300 tons—of course, gave a deficit of 3600l. That was not the only element of disadvantage with which they had to deal. The continued depression of trade, the diminution in the quantity of business actually done, had also contributed to reduce their income, but there were certain indications which showed that they might look forward with a reasonable amount of hope to an improved condition of things in that regard. He was not very sanguine, and did not wish to instil hopes in the new proprietors which might not be realised; but it was only right that he should mention that since the accounts were closed the price of lead had somewhat improved again, and was now 15l. 10s. per ton instead of 14l. 10s., the figure at which the valuation was taken. Trade was also improving, and with the improved prices of the better market, of course, their affairs must brighten. With regard to the Laganore mines he found the output in certain new workings had not been so favourable as they had reason to hope; but that was not a matter of discouragement, for on various occasions before they had been depressed, and improvements had taken place again. During the past half-year the raisings of lead ore at those mines were reduced to 473 tons, as compared with 513 tons in the previous year. That was a very considerable decrease; but he should mention that whereas in the previous half-year they had taken nearly the whole of the ore delivered to the smelting works from the reserved stocks, during the past half-year the 473 tons delivered were actually raised, and the reserved stock, instead of being encroached upon, was increased from 2030 tons to over 2100 tons.

With reference to the other items in the accounts, he mentioned that they had introduced into their capital account two new items. They had at Knockmishon, amongst other of their various establishments, a corn-mill, which was originally acquired by the company for the purpose of getting the control of the water-power which belonged to the mill. At the time of the famine, 1846-7, it had become a matter of great importance, as they were then employing between 700 and 800 men, to supply them with food, and they fitted up the mill with improved machinery for that purpose. When the pressing necessity passed the mill was let, and they had now sold it. As the original purchase-money was taken out of capital, of course the sum it realised—925l.—was placed to the credit of capital. At Glendalough they held mining royalties under the Archbishop of Dublin, until the rights of that see were vested in the Church Commissioners. Their lease was within 12½ years of running out, and the Church Commissioners proceeded to sell the royalties. The Commissioners considered it very impolitic to allow it to get into the hands of strange persons, who might, in the event of their wishing to get a renewal of their lease, exercise very unpleasant pressure upon them. They were paying 95l. a year, and the valuation of the 12½ years to run was with interest 905l. They had only paid 1200l. in all for it—that was to say, 300l. for the reversion at the termination of the lease—and he thought that they would all agree with him that that was a good purchase. The coals were the only portion of their operations which showed a positive profit. That arose partly from the increase in the quantity raised. They had been diminishing the amount of coal and culm raised at the collieries for some time, as they were anxious to reduce as much as possible the expenditure in that district, the amount of sales and the amount of profit having gradually fallen off. However, they feared they had been running a little too close to the wind in that respect, and particularly as there

were some questions with regard to workmen whom it would not be desirable in the present depressed state of the country to throw out of work, so they subsequently authorised a certain amount of increase during the half-year, which had the effect of raising the tonnage from 13,000 tons, which it was in the previous half-year, to 15,600. Unfortunately, however, owing to the depressed state of the country and almost total absence of money among the small farmers in that part of the country, the amount of sales had fallen off. There were 1000 tons less sold, but, however, the increase in the stocks brought a profit which the report sufficiently indicated. They had every hope that they had passed the worst period in the condition of the collieries. In order to facilitate the sales, they authorised their agent to reduce the price at certain pits which were in a more favourable situation, and that, they had found by returns since made, had produced a good effect, so they had good reason to expect their transactions in the district would be much more profitable in the coming than in the last half-year. Another feature which would probably tend to improve their condition was that whereas previously the nearest railway station was Thurles, entailing between 12 and 13 miles land carriage, which in the price of culm was a considerable thing, now, owing to the completion of the line between two of the most important towns in the district—Thurles and Clonmel—the station was brought to 2½ miles of one of their collieries which had previously been a place very difficult to get at, and which had been very little worked. They had now extended the workings there, and had a stock of culm ready for embarkation upon the new railway. He thought it only right under the present circumstances to lay before them the fullest statement of affairs which he was competent to do.

The report was passed unanimously, and the proceedings terminated.

**VAN RAILWAY.**—The half-yearly meeting of shareholders was held at the company's offices, Austinfriars, on Thursday (Mr. William Page occupied the chair). The balance on revenue account is 118l. 11s. 2d., which, added to 263l. 8s. 2d. from last half-year, makes a total of 381l. 19s. 4d. The directors recommend a dividend of 2 per cent. per annum, free of income tax, which will absorb 200l., and to carry the balance of 181l. 19s. 4d. forward to next account. The outlay upon permanent way has been charged to revenue account, and the renewal fund remains as before, 534l. 10s. The report and accounts were unanimously adopted. Messrs. A. R. Boughton-Knight and R. Oldrey were re-elected directors, and Mr. H. J. Whaley was re-appointed auditor. The auditors, pursuant to Acts 30 and 31 Viet., cap. 127, sec. 30, certify that they have examined the accounts for the past half-year, and that to the best of their knowledge and belief they contain a full and true statement of the financial condition of the company, and that the dividend of 2 per cent. per annum, proposed to be declared on the stock for the half-year ending June 30 is *bona fide* due thereon.

[For remainder of Meetings, see to-day's Journal.]

#### THE VAN MINES—MONTHLY REPORT.

July 22.—As under, I beg to hand you my monthly report and acting-list:—The 120 west is set to six men, at 150s. per fathom; and the lode in this end is worth 2 tons of lead ore per cubic fathom, and is likely for further improvement. The lead is best in the bottom of the level, and the water and gas issue very strongly—a good indication for the next level. The 105 west is set to four men, at 100s. per fathom. At the present end—the 160, west of shaft—we have crossed 3 ft. north, and find the lode to be worth 10 cwt. of lead ore per cubic fathom so far as seen. At a point 4 fms. west of shaft we have commenced cutting a ledge in the side of the level, for the purpose of sinking a winze to ventilate the 120. The two stops in the back of the 105 west are set to eight men in each, at 50s. per fathom; the lode here is 17 ft. wide, worth on the average 2 tons of lead ore per cubic fathom. The intermediate level having become poor for lead is suspended. The 90 west is set to six men, at 80s. per fathom; the end of this level shows spots of lead occasionally, but in the footwall we have a very nice lode, producing 1 ton of lead ore per cubic fathom—a great improvement upon the level above. The stops in the back of the 90, east and west of shaft, are on the average 17 ft. wide, worth 1 ton of lead ore per cubic fathom, set as follows:—The 20 east to four men, at 40s. per fathom. The 20 west to eight men, at 40s. per fathom. The 60 west to six men, at 70s. per fathom. The 60 west to eight men, at 75s. per fathom. The 80 west to eight men, at 55s. per fathom. The 140 west to eight men, at 45s. per fathom. The 75 ft. permanent level is set to four men, to drive west at 80s. per fathom.

The stops in the back of the 75, east and west of shaft, are on the average 24 ft. wide; worth 22 cwt. of lead ore per cubic fathom. Set as follows:—The 20 east, to six men, at 65s. per fathom. The 30 west, to eight men, at 47s. 6d. per fathom. The 50 west, to eight men, at 47s. 6d. per fathom. The 60 west, to eight men, at 47s. 6d. per fathom. The 100 west, to eight men, at 47s. 6d. per fathom. The 150 west, to eight men, at 65s. per fathom. The 60 is now within 12 fms. of reaching Edward's shaft. We got now and then a flint of lead in this driving; set to four men, at 70s. per fathom. The stop in the back of the 60 west is on the average 21 ft. wide; worth 1½ tons of lead ore per cubic fathom. Set to eight men, at 75s. per fathom. The stop in the back of the 30 east is 11 ft. wide; worth 1 ton of lead ore per cubic fathom. Set to six men, at 65s. per fathom. We shall resume the cross-cuts in the 120 to prove the value of the lode in a few days. At present this pair of men are driving to extend the 140 stop in the back of the 90 west. The cross-cut to intersect the north lode is driven 34 fms. We have intersected the branch which at present we believe to be the north lode, but later experience at East Van, where we have found it in two places, convince us that we have not yet reached the right thing, and probably we shall have to cross-cut another 10 fms. before we find it; set to six men, at 85s. per fathom.—Surface: All surface work is going on regularly. Slime-pits in good order, and working well. Our monthly sales are 200 tons lead ore and 150 tons blende. Everything on the farm is in good order. We are busy with our hay harvest, and the crops are very good.—W. H. WILLIAMS.

#### THE ALMADA AND TIRITO CONSOLIDATED SILVER MINING COMPANY (LIMITED).

**MINA GRANDE.**—Capt. N. C. Morcom, May 15: The 12, driving north, has come in contact with the large feldspar. The drive is suspended for the time being, and the men put to take down the side of the level where the lode is fairly productive. The bed of feldspar met with in the 12 end is the same as found in the mine sinking below the 12; its inclination is north-east, and appears to be of great thickness. The 12 winze, sinking below the 12, is still in an unproductive state; there are some slight indications of a change taking place, there being a little more quartz mixed with the feldspar, and an occasional spot of ore met with. The stoping of the bottom of the 15 having become unproductive of metals in sufficient quantities to pay the expense of excavation, is suspended. The stops in back of the 12 are much as usual, producing large quantities of blende.

May 21: The mine sinking below the 12 is still in a hard and barren feldspar and quartz, but little progress is made in sinking on account of the very hard nature of the rock. The winze has reached a depth of 28 ft. from the bottom of the 12; the first 8 ft. was sunk in a very good and compact lode, when a strong course or fault of feldspar from the north-east made its appearance, and completely changed the character of the lode, if a lode it may be called. There is still a good west wall, which is about the only thing to indicate we are on the lode's course, with the exception of an occasional speck of ore. Our hope is that the lode will as suddenly make again as it is cut off; it is evident, however, that nothing of the like nature has before taken place in this part of the mine, and I believe nowhere else. The 12 north will not be driven until ore is again met with in the winze. In the meantime we shall continue to stop north upon the back of the fault, and see where it will lead up. The stops in back of the 12 are much as when commenced in a splendid lode. A cross-cut west of tunnel level, and a little north of our present and ancient workings, has been recently started with, I am glad to say, very pleasing results as far as the width and nature of the lode found is concerned. We intersected the lode 2 ft. west of the tunnel, 10 ft. below the 12, and no water was in sight as yet; it consists of quartz, green ore, and occasional stones of petanque; the assay value of this ore will shortly be sent you. From this point we intend to work upwards and prove the northern ground as yet untried, and in the meantime search for any arches and pillars the old workers may have left; this I believe to be the best and safest speculation in the whole concern.

June 4: The ground in the winze sinking below the 12 is a little more favourable for extraction; there appears to be a slight change taking place in the character of the rock—feldspar giving place to quartz, which we think is a favourable indication. The western wall is still in good order, and is quite an exception to the general rule, as generally we have no distinct wall to the west, the lode breaking itself up very abruptly into the country rock (porphyry), and dies away. I might here mention that the late drive of the 12 north was attended with a clean and well defined west wall, and with a richer lode than otherwise; hence our hope of a change soon taking place for the better in this point of great interest. The productivity of the lode in the stop in back of the 12 is much as usual, with the exception of the north end, which is mixed with a considerable quantity of feldspar. The cross-cut west at tunnel level has now a length of 17 ft. fathoms, a productive lode of green dolomite metal. There is no wall in sight as yet, still I believe we are very near its border. The result of the assay which has been sent you is very encouraging. This place will henceforth be known as—

**SAN JUAN'S.**—There is now every prospect of San Juan's and other points keeping our patio going again for some considerable time.

**LA VIRGEN.**—May 15: The stops in the back of tunnel level are yielding black and green ore as for some time past; this stop is now 18 fms. above tunnel, and bids fair to continue higher yet. There is no doubt, I think, that this so-called Virgen lode is only a large offshoot from the main or Providencia lode. The stop in back of the 10 is still producing good black ore. A stop just started in bottom of the 10 is productive of black ore in paying quantities; this will probably not make far in depth.

May 21: The lode in the stop above tunnel level still continues to yield green and black metal as for a long time past. The stop in back of the 10 is productive of good black ore. A new stop in bottom of the 10 is just started. The lode is fairly productive at present; probably it may not make far in depth; at all events the stop will soon prove it. It is near this place where the Virgen branch joins the main lode; hence our not expecting it to make far in depth.

June 4: The stop above tunnel level is at present looking very well in green and black metals. The stop in back of the 10 is getting a little poorer. The same remarks will apply to the stop in bottom of the 10; here we did not anticipate finding much below the level, as at this point the Virgen branch merges into the main lode.

**TIRITO.**—May 15: The excavation of the arch is now finished that we found standing just below the 10; it has been of great service to us.

May 21: Operations in the shape of a long winze are begun in the bottom of the 20, north of the Tirito engine-shaft. The lode has a strong and good appearance, producing black ore in paying quantities.

June 4: The stop in the bottom of the 20, north of the engine-shaft, has been productive of some good stones of black metal. We have run down and sent to surface several tons of good looking stuff from the 20 still, south of the shaft.

**FIRST LODE.**—May 15: The mill and footway to the stop in the back of tunnel are now completed, and stoping will forthwith be resumed. The lode is a little smaller than it was, but the ore is of a good ley. Next week we shall start a cross-cut from tunnel level to intersect the lode.

May 21: Stoping is resumed on this lode in the back of tunnel level. The pre-

sent appearance is good, with 2 ft. of good green ore. The cross-cut from tunnel level towards the lode is started. It will be short and inexpensive, and doubtless will facilitate the taking away of the ore already discovered.

June 4: The stop above tunnel has yielded some fine green ore of late; the lode has now fallen off in size and value. This is not to be surprised at, as it is the nature of this lode to be bumpy.

**LAS FLOMOSES.**—May 21: As depth is being attained the lode appears to be getting stronger, and is more productive. The present value is 2½ tons per fathom. This is a kindly concern, and may be found to be a good lead mine, which will be of great value to the new blast-furnace. I spoke in my last of the being other points in this set deserving attention.

J. H. Clemen, May 8: In case you are successful in obtaining funds for exploration we shall at once start a rise for the ancient Mina Grande Mine. The bad luck of things downwards will cause us to look upwards; there is plenty of ground above tunnel. Whatever may exist at great depths, moderate depths—say, 500 to 600 ft.—seem to affect unfavourably all the mines on this ridge. There is a vast difference between the present treatment of black ore and the former plan of budding and shipping them that a good "find" of them is nearly as valuable as one of docile ores. We feel certain that black ores exist in the old Mina Grande Mine.

May 22: You will notice that Capt. Morcom in his report corroborates the oft-expressed opinion of the writer that this northern extension of the main body is the "best and safest speculation in the whole concern." There is a very large extent of unexplored ground in this part of the property. The cross-cut now traversing the lode so far reveals an ore width of 10 ft.

May 29: The lode has now been cross-cut for a distance of 14 ft., and the face of the cross-cut is still in good green ore; the lode is dredgy, but the proportion of ore present will leave a fair margin for profit. Two piles roughly broken for the stamps added—No. 1, 41½ ozs. per ton of 2000 lbs.; No. 2, 46½ ozs. per ton of 2000 lbs. Capt. Morcom now reports an ore width of 15 ft.

June 5: The 1500l. additional mortgage debentures shall be applied in the most judicious way we can devise. The explorations now going on are the 12 winze, this is expensive, a drift north on the primera vets (first lode), and the San Juan cross-cut. The latter is no longer an exploration, but will soon be a remunerative stop. This is the best way into the ancient Mina Grande Mine. Explorations as well as every other expense is now debited to profit and loss account.

The directors have also received a telegram, dated June 12, as follows:—The winze from the 12 ft. level north end improving.

#### ST. JOHN DEL REY MINING COMPANY (Limited).—Advices received July 7, 1880, dated Morro Velho, June 2:—

**GENERAL OPERATIONS.**  
GOLD EXTRACTED TO DATE.—The produce for the second division of May, a period of ten days, amounts to 10,641·9 oits., = 1226·8379 ozs. troy. It has been derived as follows:—  
General mineral ..... 5,443·0 from 302 = 6·787  
ditto Cotesworth—E. shallow ..... 895·3 " 212 = 4·223  
ditto ditto W. deep ..... 978·2 " 147 = 6·551  
Mineral free from killas ..... 2,749·5 " 347 = 7·923  
Re-treatment ..... 10,068·0 " 1508 = 6·675  
Total ..... 575·9 " — = 0·382

**MINE.**—Return of duty for 13 working days:—  
Mineral raised from the mine ..... 2404 tons  
Mineral quarried per borer per diem ..... 1·59  
Average attendance of borers daily ..... 116·00  
Average attendance of natives daily ..... 235·07

**MEASUREMENTS FOR THE MONTH OF MAY.**  
Sinking sump-shaft vertically ..... 5 ft. 4 in  
Width of excavation and size of lode without change.

Driving—Level 217 D ..... 13 10  
Level 277 A ..... 25 0  
Western level 233 B ..... 15 6  
South-western level ..... 11 6

Width of breast from 8 to 9 ft., the whole of which is mineral of fair quality.

Total rainfall for May ..... 0·50 in.  
Advices received July 17, 1880, per Tamer (s.), dated Morro Velho, June 12:—  
**GENERAL OPERATIONS.**—An improvement of ·769 oit. in the average yield per ton, and the treatment of 797 tons more in May than in the preceding month, accounts for the produce obtained in the former period being 8810 oits. in excess of that extracted in April.

**PRODUCE FOR THE MONTH OF MAY.**—The gold extracted in the above period amounts to 33,031·2 oits., equal to 3807·9602 ozs. troy. It has been derived as follows:—

General mineral ..... 16,593·3 from 2707 = 6·129  
ditto Cotesworth—E. shallow ..... 3,090·3 " 660 = 4·682  
ditto ditto W. deep ..... 2,705·2 " 505 = 5·357  
Mineral free from killas ..... 8,354·3 " 1142 = 7·315

Re-treatment ..... 30,743·1 " 5014 = 6·132  
2,288·1 " — = 0·455  
Add recovered from crucibles ..... 93·1 " 5014 = 6·588

Total ..... 33,124·3

**COST AND PROFIT.**  
Produce for May ..... 33,124·3 oits.  
Less loss on melting ..... 155·3

Cost ..... 32,969·0, at 7s. 9d. per oit. = £12,775 9 9  
Profit ..... £ 5,552 10 6

**MINE.**—Mineral raised from the mine ..... 4947 tons  
Mineral quarried per borer per diem ..... 1·70  
Average attendance of borers daily ..... 111·80  
Average attendance of natives daily ..... 223·19

**EASTERN SECTION.**—During the month the same shaft was sunk more than the average without any observable change in the character or appearance of the lode. The width of the stop east of the sump is 26 ft., a large proportion of which is pure mineral, and the first stop immediately west thereof is of the same width, and likewise contains a fair proportion of good mineral.

The remaining stopes west of this point present no material change or alteration since last reported on.

**WESTERN SECTION.**—A large proportion of the mineral treated during the month was again derived from this part of the mine.

The lode in sections 277 C and 276 D varies from 24 to 35 ft. in width, a portion of which is ore of medium grade.

Operations at the other points in this section of the mine have been carried on vigorously, the lode presenting no appearance of change either in size or quality.

**CUIABA.**—Gold produce for May, 787 oits., from 335 tons, equal to 2·349 oits. per ton.

Produce as above ..... 787 oits.  
Less loss on melting ..... 8 "

Cost (inclusive of deep adit and surface works) ..... 53 16 3½

Expenditure on capital account in excess of produce ..... £258 19 4½

A large amount of exploratory and other work has been performed in the mine, and considerable progress has been made in the preparations for the new machinery. The deep adit was driven during the month 25 ft. 3 in., being a few feet less than that for the preceding month, in consequence of a hard bar of ground having been met with.

**GOLD EXTRACTED TO DATE.**—The produce for the first division of June, a period of 11 days, amounts to 10,078·9 oits., equal to 1161·9331 ozs. troy. It has been derived as follows:—

General mineral ..... 4,936·3 from 1083 = 4·558  
ditto Cotesworth—E. shallow ..... 1,067·0 " 248 = 4·302  
Mineral free from killas ..... 2,884·0 " 401 = 7·192

Re-treatment ..... 8,887·3 " 1732 = 5·131  
1,191·6 " — = 6·65

Total ..... 10,078·9 " 1732 = 5·819

**MINE.**—Return of duty for 13 working days:—  
Mineral raised from the mine ..... 2362 tons  
Mineral quarried per borer per diem ..... 1·51  
Average attendance of borers daily ..... 120·15  
Average attendance of natives daily ..... 242·77

No change to advise in any section of the mine.

The gold troop, conveying seven boxes of bar gold, weighing in all 32,594·5 oits., equal to 3803·7292 ozs. troy, was dispatched for Rio and England on the 16th inst.

**N.B.**—The gold has duly arrived.

**TELEGRAMS RECEIVED.**—On June 24, dated Rio, the 23rd.—Produce eleven days (first division of June), 10,000 oits.; yield, 5·8 oits. per ton. Profit for the month of May, 5500l. All going on well.

On July 2, dated Rio, the 1st.—Produce nine days (second division of June), 8750 oits.; yield, 6·5 oits. per ton.—Cuiaba: Haulage 160 tons in 15 days; yield, 2·5 oits. per ton.

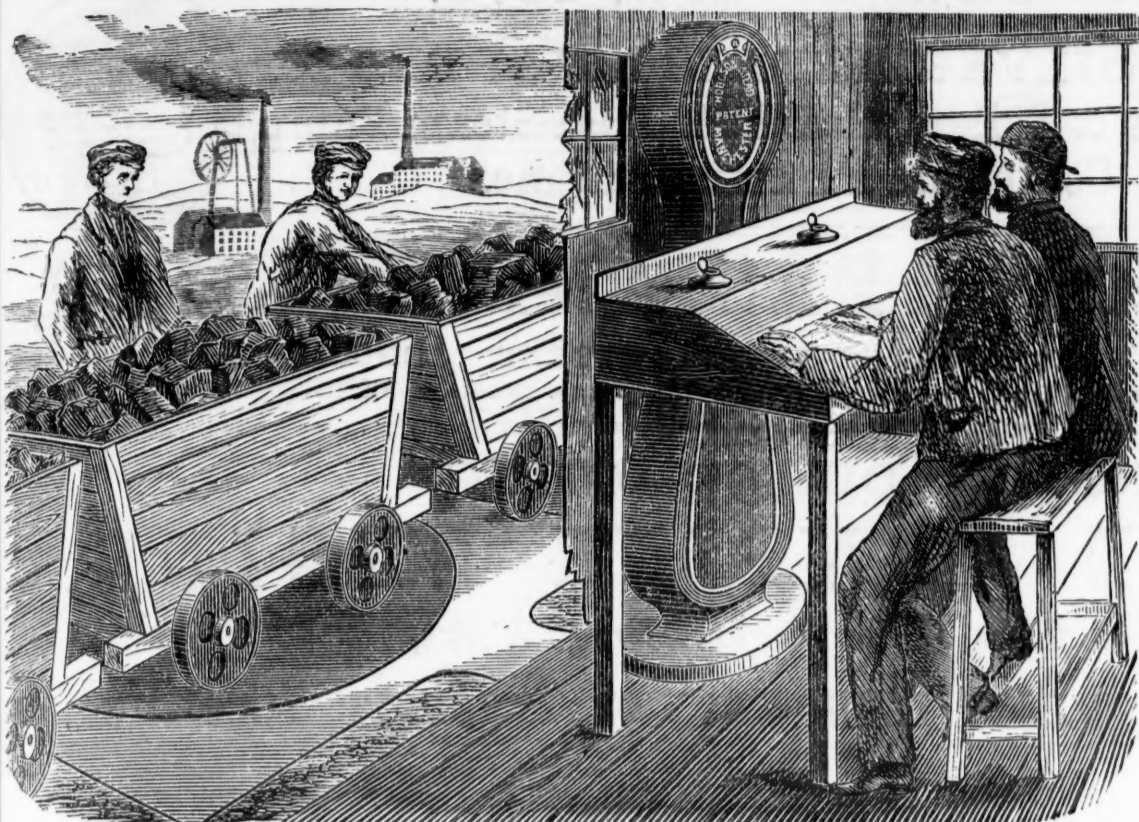
On July 13, dated Rio, the 12th.—Produce for the month of June 28,000 oits.; yield, 6·4 oits. per ton.—Cuiaba: 150 tons stamped in 15 days; yield, 2·7 oits. per ton. All going on well.

[For remainder of Foreign Mines see to-day's Journal.]

**PIG-IRON SHIPMENTS.**—A Return, compiled from Custom House Reports, shows that out of the 116,073 tons of pig-iron exported from England, Scotland, and Wales during last month not less than 44,695 tons were shipped from the port of Middlesbrough, Barrow-in-Furness comes second with 17,585 tons; Glasgow, exporting 12,729 tons took the third place, followed by Liverpool with 11,158 tons. West Hartlepool, exporting 4451 tons, follows after Newcastle, which shipped foreign 7235 tons last month.

**NEW YORK PENNSYLVANIA AND OHIO RAILROAD** (late Atlantic and Great Western).—The gross actual earnings for the month of May amounted to \$346,444, against \$317,143 for corresponding period last year. The net earnings, after deducting all charges, rents, &c., amount to \$19,313, against a deficit of \$105,137, making a net surplus of \$401,501 for the five months against a deficit of \$165,180 for same period last year. The estimated traffic receipts for the month of June amount to \$364,109, against the corrected actual earnings for corresponding period last year amounting to \$301,272: showing an estimated increase of \$62,837.

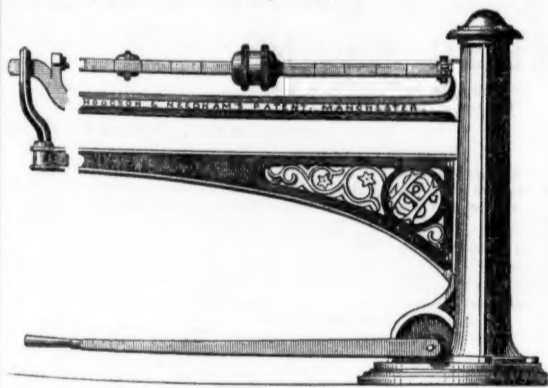
## SELF-INDICATING WEIGHING MACHINERY.



## SELF-INDICATING WEIGHING MACHINERY.

It has now become so customary to deal almost exclusively by weight that in large scale transactions movable weights have become altogether inadmissible, and consequently lever weighings have become almost a necessity, and Messrs. HODGSON and STEAD, of the Egerton Ironworks, Manchester, and of London, have gone still further in providing a self-indicating machine. The efforts of weighing machine makers have for years past been turned towards the production of a machine which would indicate the weight of a load without the attendant having to manipulate either the machine or weights, and appliances of varying degrees of merit have been put on the market. But the fact that so very few of them have survived the test of actual work shows that they did not supply what is absolutely needed in an article of so much importance as a weighing machine—accuracy, simplicity, durability. Amongst the best of them was a machine which Messrs. Hodgson and Stead patented many years ago specially for pit bank work, and which in many mining districts met with great approval; but they were anxious to supply something much more simple, and capable of standing rougher usage. The unprecedented demand caused by the Coal Mines Regulation Act of 1872 for such a machine forced them to give the matter immediate attention, and the practical experience they had had in the working of their first machine enabled them to produce their new patent, which is admitted by those competent to judge to be all that can be desired in a "self-indicator."

The machine itself is a combination of levers, on the principle of their well-known platform machines, but in the place of the usual pillar and steel yard is an iron case containing the dial, on which is given the indication of the weight. The mechanism is so simple that there is little or no liability to disarrangement; there are no springs or anything to cause variation and irregularity, and as the weigh-clerk has not to touch the machine, but simply to read the indication or result from the dial, mistakes are all but impossible. The machines are supplied of any power from 1 ton upwards for pit bank and tram work, and up to 20 tons for railway traffic.



The patent "Polygonal" Steelyard (second diagram) was invented to meet the pressing demands of their foreign customers, who often require the weight to be given in more than one standard. This is accomplished by making a many-sided steelyard, and showing on every face a different standard. The steelyard has two arms geared together; on one is engraved the principal denomination only—say, tons—and on the other the necessary sub-divisions. This arrangement gives clearness and distinctness, and allows the weight which is most in use to be reduced to a small and handy size. When the weight is ascertained in any standard it is only necessary to cause the bars to revolve to find the equivalent in some other, and as the arms revolve together, the corresponding faces are always presented to view.

The HODGSON AND STEAD MACHINES have been largely introduced in connection with both mines and collieries at home and abroad, and their large and rapidly-increasing sale evidences the general satisfaction given by them.

## ROTARY ENGINES.

In connection with rotary engines driven by steam, water, or other motive fluid an arrangement which is applicable also to apparatus for exhausting and forcing liquids and for measuring has been invented by Mr. EDWARD HALL, of Boston. The cylinder or chamber in which the piston travels is of annular form; it is made of two parts joined together, and the joint further from the centre may be made tight by a ring entering grooves in the two parts or castings. The piston is carried by a plate having a boss, and fixed on a shaft concentric with the annular cylinder or chamber. This plate works between the two parts of the annular cylinder or chamber, a tight joint being formed by packing springs bearing against the two faces of the plate. The plate has a projecting part which protrudes into the cylinder or chamber; the piston is fastened to this projecting part, which is overlapped by projections formed with the piston itself. At two opposite sides of the shaft the annular cylinder or chamber has in its ports or openings governed by suitable valves, so as to alternately admit steam or other fluid or liquid to and allow its escape from the cylinder or chamber. Midway between the two above-named ports at each side of the shaft the annular cylinder or chamber is provided with two sliding parts, so arranged and operated that when the one pair is open the other pair will be closed, thus forming a partition, stop, or abutment across the annular cylinder or chamber.

The piston is moved by steam or other motive fluid entering the annular cylinder or chamber between one of the partitions, stops, or abutments (for the time closed) and the piston. As the piston travels along the annular cylinder or chamber the pair of sliding parts constituting the partition, stop, or abutment that was closed, gradually opens (so that the piston may pass it) and the other pair closes, and so on alternately. The sliding parts of the partitions, stops, or abutments, are operated by suitable connections from a cam or eccentric fixed on the shaft, of suitable form to give the required movements through the connections to the sliding parts of the partitions, stops, or abutments. The admission and exhaust valves may be in the form of plugs, having a partial rotary motion, which may be given through suitable connecting rods from a pair of eccentrics on the shaft. Reversing gear may be provided, and to start the engine when the periphery of the piston is opposite a port, supplementary inlets with a suitable valve or cock may be provided.

**CORNISH PUMPING-ENGINES.**—The number of pumping-engines reported for June is 16. They have consumed 1369 tons of coal, and lifted 10.3 million tons of water 10 fms. high. The average duty of the whole is, therefore, 50,900,000 lbs. lifted 1 ft. high by the consumption of 112 lbs. of coal. The following engines have exceeded the average duty:—

Carn Brea—76 in.	Millions	55.2
Dolcoath—85 in.		60.9
Mellancarr—Gundry's 30 in.		57.1
West Basset—Grenville's 70 in.		51.8
West Basset—Thomas's 60 in.		53.7
West Tolgus—Richard's 70 in.		53.5
West Wheal Seton—Harvey's 85 in.		58.2
West Wheal Seton—Rule's 70 in.		72.5

**HOLLOWAY'S OINTMENT AND PILLS—SURE RELIEF.**—The weak and enervated suffer severely from nervous affections when storms or electric disturbances agitate the atmosphere. Neuralgia, gouty pangs, and flying pains, very distressing to a delicate system, may be readily removed by rubbing this ointment upon the affected part after it has been fomented with warm water. The pills, taken occasionally in the doses prescribed by the instructions, keep the digestion in order, excite a free flow of healthy bile, and regenerate the impoverished blood with richer materials resulting from thoroughly assimilated food—wanting which, the strongest must inevitably sink into feebleness, and the delicate find it difficult to maintain existence. Holloway's ointment and pills are infallible remedies.



PARIS, 1867.  
BRONZE MEDAL, 1867.



ORDER OF THE CROWN OF PRUSSIA.



FALMOUTH, 1867.  
SILVER MEDAL, 1867.

**A DIPLOMA—HIGHEST OF ALL AWARDS**—given by the Geographical Congress, Paris, 1875—M. Favre, Contractor, having exhibited the McKean Drill alone as the **MODEL BORING MACHINE** for the **ST. GOTHARD TUNNEL**.

**SILVER MEDAL** of the Highland and West of Scotland Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

## THE MCKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecutive weeks, ending February 7, was 24.90, 27.60, 24.80, 26.10, 28.30, 27.10, 28.40, 28.70 metres. Total advance of south heading during January was 121.30 metres, or 133 yards.

In a series of comparative trials made at the St. Gothard Tunnel, the McKean Rock Drill continued to work until the pressure was reduced to one-half atmosphere ( $7\frac{1}{2}$  lbs.), showing almost the entire motive force to be available for the blow against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these Machines for the SEVERN TUNNEL; the LONDON AND NORTH-WESTERN RAILWAY for the FESTINIOG TUNNEL; and the BRITISH GOVERNMENT for several Public Works. A considerable number of Mining Companies are now using them. Shafts and Galleries are driven at from three to six times the speed of hand labour, according to the size and number of machines employed, and with important saving in cost. The ratio of advantage over hand labour is greatest where the rock is hardest.

These Machines possess many advantages, which give them a value unapproached by any other system of Boring Machine.

**THE MCKEAN ROCK DRILL IS ATTAINING GENERAL USE THROUGHOUT THE WORLD FOR MINING, TUNNELLING, QUARRYING, AND SUB-MARINE BORING.**

The MCKEAN ROCK DRILLS are the most powerful—the most portable—the most durable—the most compact—of the best mechanical device. They contain the fewest parts—have no weak parts—act without SHOCK upon any of the operating parts—work with a lower pressure than any other Rock Drill—may be worked at a higher pressure than any other—may be run with safety to FIFTEEN HUNDRED STROKES PER MINUTE—do not require a mechanic to work them—are the smallest, shortest, and lightest of all machines—will give the longest feed without change of tool—work with long or short stroke at pleasure of operator.

The SAME Machine may be used for sinking, drifting, or open work. Their working parts are best protected against grit and accidents. The various methods of mounting them are the most efficient.

**N.B.**—Correspondents should state particulars as to character of work in hand in writing us for information, on receipt of which a special definite answer, with reference to our full illustrated catalogue, will be sent.

**PORTABLE BOILERS, AIR COMPRESSORS, BORING STEEL, IRON, AND FLEXIBLE TUBING.**

The McKean Drill may be seen in operation daily in London.

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GLASGOW.

## WIRE ROPES.

## JOHN AND EDWIN WRIGHT

PATENTEES.



ESTABLISHED 1770.

**MANUFACTURERS OF EVERY DESCRIPTION OF IMPROVED**

## Patent Round and Flat Wire Ropes

From the very best quality of Charcoal and Patent Steel Wire. Galvanised Wire, Ropes for Ships' Rigging, Galvanised Signal and Fencing Strand, Copper Rope, Lightning Conductors, Colliery Ropes and Steam Plough Ropes made from the best Patent Improved Steel Wire.

**PATENT ROUND AND FLAT HEMP ROPES,**  
Hemp, Flax, Engine Yarn, Cotton Waste, Tarpauling, Oil Sheets, Brattice Cloth, Wagon Covers, &c., &c.

UNIVERSE WORKS, MILLWALL, POPLAR, LONDON.  
UNIVERSE WORKS, GARRISON STREET, BIRMINGHAM.

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**PIERCE S. HAMILTON, PRACTICAL GEOLOGIST, SURVEYOR, AND MINING ENGINEER AND AGENT, OFFERS HIS SERVICES** in either of these capacities to those interested or desirous of investing in MINING PROPERTY in the PROVINCE OF NOVA SCOTIA or elsewhere in the DOMINION OF CANADA.

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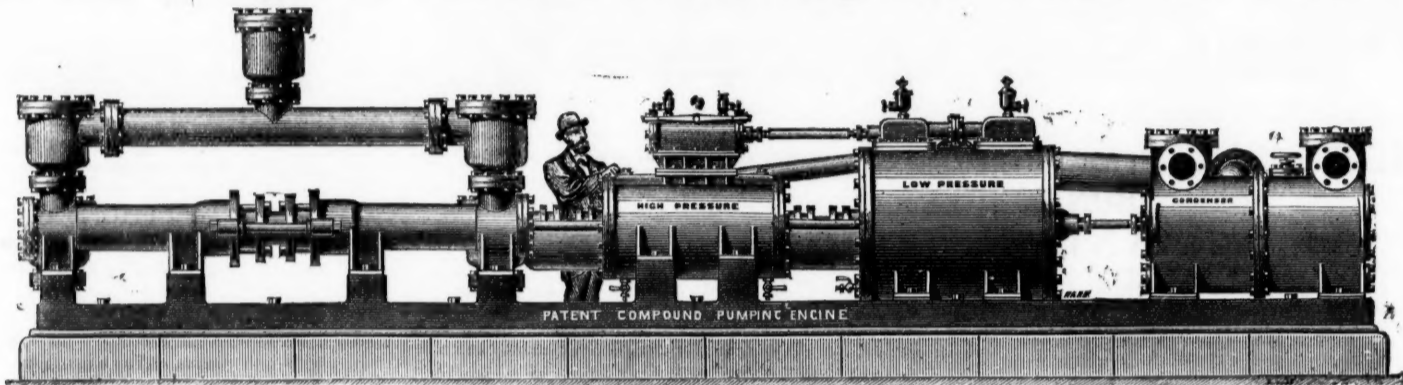
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TANGYE'S COMPOUND PUMPING ENGINE COMBINES SIMPLICITY, CERTAINTY OF ACTION, GREAT ECONOMY  
IN WORKING, COMPACTNESS, AND MODERATE FIRST COST.

This Engine will be found the most simple and economical appliance for Mine Draining, Town Water Supply, and General Purposes of Pumping ever introduced, and as regards Mine Draining, the first cost is very moderate compared with the method of raising water from great depths by a series of 40 or 50 fm. lifts. No costly engine-houses or massive foundations, no repetition of plunger lifts, ponderous connecting rods, or complication of pitwork, are required, while they allow a clear shaft for hauling purposes. In this Engine the economical advantages resulting from the expansion and condensation of steam are very simply and effectively obtained. The steam after leaving the high-pressure cylinder is received into and expanded in the low-pressure cylinder, and is thus used twice over before being exhausted into the condenser or atmosphere.

The following first-class Testimonials will bear evidence as to the efficiency and economy of the Engine :—

TESTIMONIALS OF TANGYE'S COMPOUND PUMPING ENGINE.

21' Newcastle and Gateshead Water Company, Newcastle-on-Tyne, Oct. 20, 1879.  
36" x 10" x 48" COMPOUND CONDENSING STEAM PUMPING ENGINE.  
Messrs. Tangye Brothers.  
GENTLEMEN,—In reply to your enquiry as to the efficiency of the two pairs of Compound Condensing Engines recently erected by you for this company at our Gateshead Pumping Station, I have great pleasure in informing you that they have far surpassed my expectations, being capable of pumping 50 per cent. more water than the quantity contracted for; and by a series of experiments I find they work as economically as any other engine of the compound type, and will compare favourably with any other class of pumping engine. By the simplicity of their arrangement and superior workmanship they require very little attendance and repairs, and the pumps are quite noiseless. A short time ago I had them tried upon air by suddenly shutting off the column, and found they did not run away, thus showing the perfect controlling or governing power of the Floyd's Improved Steam-moved Reversing Valve. I will thank you to forward the other two pairs you have in hand for our Benwell Pumping Station.  
(Signed) JOHN R. FORSTER, Engineer.

21' The Chesterfield and Boythorpe Colliery Company (Limited),  
Registered Office, Boythorpe, near Chesterfield, Oct. 1, 1879.  
36" x 12" x 48" DOUBLE RAM COMPOUND CONDENSING STEAM PUMPING ENGINES.  
Messrs. Tangye Brothers.  
Supplied in January, 1878.  
GENTLEMEN,—Referring to the above, which we have now had working continuously night and day for the last 12 months, we are glad to say that it is giving us every satisfaction. It is fixed about 400 feet below the surface, the steam being taken down to it at pressure of 45 lbs. per square inch. We can work the pump without any difficulty at 28 strokes per minute=224 ft. piston speed. The pumping power is enormous. The vacuum in the condenser being from 11½ to 13 lbs. The pump is easily started, and works well and regularly. The amount of steam taken being much less than we anticipated. We consider the economy in working very satisfactory indeed. The desire for power and economy at the present day will certainly bring this pump into great requisition.  
Yours truly,  
(Signed) M. STRAW, Manager.

SIZES AND PARTICULARS.

Diameter of High-pressure Cylinder.....In.	8	8	8	10	10	10	10	12	12	12	12	14	14	14	14
Ditto of Low-pressure Cylinder .....	14	14	14	18	18	18	18	21	21	21	21	24	24	24	24
Ditto of Water Cylinder .....	4	5	6	5	6	7	8	6	7	8	10	7	8	10	12
Length of stroke .....	24	24	24	24	24	24	24	24	24	24	24	36	36	36	36
Gallons per hour approximate .....	3900	6100	8800	6100	8800	12,000	15,650	8,800	12,000	15,650	24,450	12,000	15,650	24,450	35,225
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder .....	360	330	160	360	250	184	140	360	264	202	130	360	275	175	122
Ditto ditto ditto—with Holman's Condenser...	480	307	213	480	333	245	187	480	352	269	173	480	367	234	162
Ditto ditto ditto—with Air-pump Condenser...	600	384	267	600	417	306	335	600	440	337	216	600	459	203	203

CONTINUED.

Diameter of High-pressure Cylinder .....	16	16	16	16	18	18	18	21	21	21	24	24	24	30	30
Ditto of Low-pressure Cylinder .....	28	28	28	28	32	32	32	36	36	36	42	42	42	52	52
Ditto of Water Cylinder .....	8	10	12	14	8	10	12	14	10	12	14	10	12	14	14
Length of stroke .....	36	36	36	36	48	48	48	48	48	48	48	48	48	48	48
Gallons per hour approximate .....	15,650	24,450	35,225	47,950	13,650	24,450	35,225	47,950	24,450	35,225	47,950	24,450	35,225	47,050	35,225
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder .....	360	230	160	118	456	292	202	149	397	276	202	518	360	264	562
Ditto ditto ditto—with Holman's Condenser...	480	307	213	154	603	389	269	198	528	363	269	691	480	352	750
Ditto ditto ditto—with Air-pump Condenser...	600	384	267	191	750	486	337	248	660	450	337	864	600	440	937

PRICES GIVEN ON RECEIPT OF REQUIREMENTS.

Any number of these Engines can be placed side by side, to work in conjunction or separately as desired, thereby multiplying the work of one Pump to any extent.

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CORRUGATED FURNACE FLUES,

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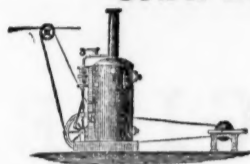
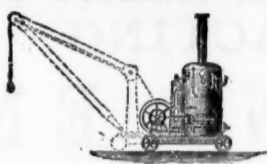
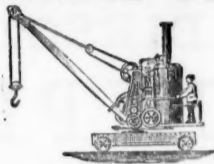
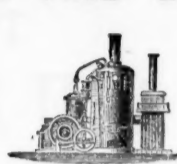
PARIS, 1878.



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No Building required.HOISTING ENGINE.  
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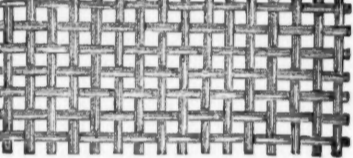
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THE SELF-ACTING PORTABLE ORE-DRESSING  
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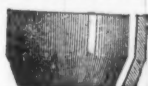
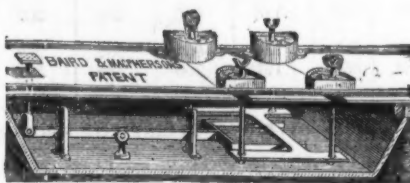
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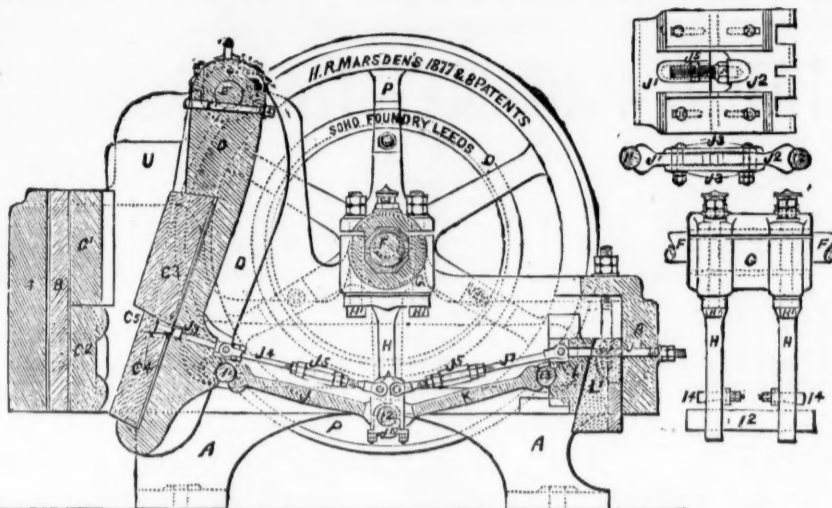
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We are, yours faithfully,  
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H. R. Marsden, Esq.,  
Soho Foundry, Meadow-lane, Leeds.

St. John del Rey Mining Company (Limited),  
A SAVING OF FIFTY-FIVE HANDS BY THE USE OF  
ONE MEDIUM-SIZED MACHINE.

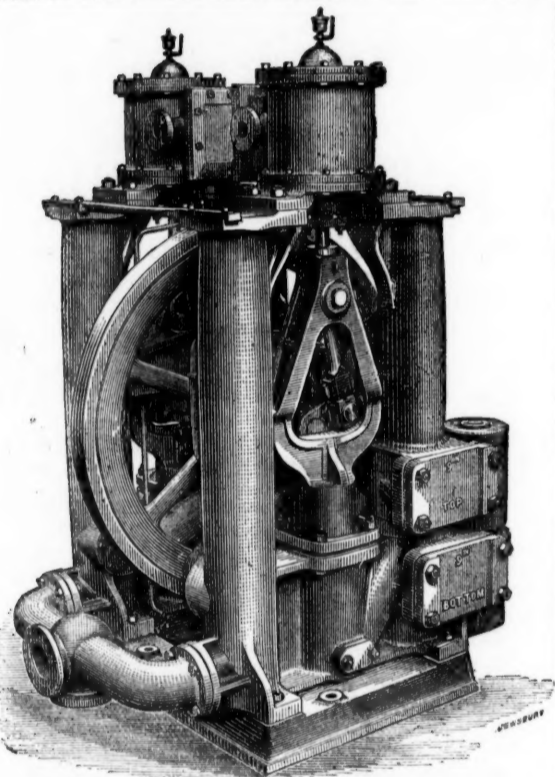
BLAKE'S STONE BREAKER.—Statement made by the  
Managing Director of the St. John del Rey Mining Company,  
Mr. John Hockin, with regard to six months' practical  
working of Blake's Stone Breaker, affording facility for  
judging of the relative economy of machine and hand  
labour in this kind of work, and also of the cost of getting  
the Stone Breaker in working order in difficult places. The price  
paid to Mr. Marsden for the machine referred to by Mr.  
Hockin was £180, and adding to this the cost of engine,  
carriage, and fixing, the aggregate cost to the company  
of the Breaker in working order was £500. By this outlay  
the company is enabled to dispense with the labour of 55  
people, the value of which is £800 per annum. The cost  
of working the machine could not be more than the wages  
of about five men (the machine requires but one man to  
feed it, so that the rest would be for engineer, fuel, oil,  
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